



## 2022 Michigan Forage Variety Test Report

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Forage crops are essential components of diversified agricultural production systems in Michigan. They provide feed for livestock, fix nitrogen for crop rotations, reduce soil erosion, improve soil structure, fertility and water retention, protect water quality, provide habitat for wildlife, generate biomass for fuel conversion, and add eye appeal to landscapes. Competition from row crops for land use continues to squeeze forage production acres while equipment, land, and labor costs increase. According to USDA information, Michigan hay prices in October 2022 were higher than a year ago. A one-ton yield increase of good to premium quality alfalfa hay was worth \$190 to \$215/acre. Under these market conditions, the importance of improving yield through the use of better forage varieties continues to be an important component of profitability. This report contains yield data from 2022 and multi-year average from previous trials. Yield data for individual cuttings from previous years are in the variety test report archives on the MSU Forage Connection website at <http://www.forage.msu.edu/publications>.



### 2022 Conditions

Annual rainfall total and 30-year averages for April through October in East Lansing in southern Lower Michigan, and Chatham in the Upper Peninsula are in **Table 1**. Some of the coldest days in the Lansing area had snow cover to help insulate the soil. There were a couple of warm spells in mid and late March that were followed by a few cold days. Some of the grass species began to grow and the new growth was damaged by these cold temperatures. Perennial ryegrass varieties in the 2- or 3-year-old stands suffered the most injury of the perennial cool-season grasses in the trials. The wet conditions in the fall of 2021 followed by some of the cold temperatures in January and February resulted in almost 100 percent stand loss of some alfalfa fields in lower Michigan south of I-69 in St Clair and Lapeer Counties. Temperatures at Chatham did not warm up as early in the spring as in 2021 and snow continued to fall through April. These cold temperatures delayed onset of growth in the perennial crops. Although grass regrowth was slow, temperatures were not low enough to cause new growth to freeze as in previous years. Rainfall totals per month was below average for much of the summer at East Lansing with August total rain the only month that was above the 30-year average. Almost half of the rain during July and August was in the last week of July and the first week of August. Monthly total rainfall was near average at Chatham for much of the growing season but lower in July.

### Methods

**Plots are managed** to provide optimum fertility and pest control. All plots are planted into prepared seedbeds using a cultipacker seeder. Alfalfa and red clover plots are 3 feet wide and

20-23 feet long. Grass plots are generally 20-23 feet long and 5 feet wide and only the center 3 ft is harvested for yield. Phosphorus, potassium, and sulfur are applied according to soil test and MSUE recommendations for the species. Perennial and annual grass plots receive 50 lb of N in spring and again after first cutting. Winter small grain plots receive 50 lb N at planting and 100 lb in the spring. Weeds and insects are controlled as needed. Plots may be irrigated if needed to prevent establishment failure but are usually not irrigated during production years. This provides information about variety resilience to variation in precipitation.

The number of harvests per year depends on species, location, and weather. Intensive five-cut alfalfa systems are possible in southern counties, but it is rarely practical to get more than three alfalfa cuts in the Upper Peninsula. Grasses regrow more slowly and provide fewer cuttings than alfalfa. Harvest targets are late bud for alfalfa, early bloom for red clover and grasses, and flag leaf for small grains. Tests are harvested using a forage plot flail harvester set at a 3- or 4-inch stubble height, depending on the crop. **Test varieties** are provided by breeders, seed marketers, or others with an interest in variety performance. Both released and experimental varieties may be entered. **Check varieties** are included in most tests. These provide reference points for estimation of relative differences among tests conducted across different years. The relative difference among varieties is expressed as a **percentage of the check** variety yield. Check varieties are chosen for suitability across a wide area of the USA. Where meaningful check varieties are not available, relative differences are expressed

as a **percentage of the test average**. The reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested.

**Statistical comparisons** allow accurate separation of true genetic effects from random variation attributed to field or weather conditions within an individual test. Comparison of yields among varieties should only be made within a trial. The **Least Significant Difference (LSD)** is the key statistic for comparing two varieties. When the difference in average yield between two varieties is greater than the LSD value, the varieties are likely to be truly different. The **Coefficient of Variation (CV)** provides an estimate of overall procedural and environmental variability in a test or cutting. When CV is greater than 10%, it can be difficult to detect genetic differences in variety performance. High CV can be related to low yields and environmental stress.

### Alfalfa Variety Trials

Long-term yield summaries for alfalfa varieties planted at multiple locations in Michigan variety trials from 2014 to 2021 are listed in **Tables 4 through 6** (pages 9 to 11). Alfalfa dry matter yields, from individual cuttings and total, in 2022 from trials at East Lansing are in **Tables 10 to 12** (pages 15 and 16) and yields from the trials at Chatham are in **Tables 13 and 14** (pages 17 and 18). New alfalfa trials were seeded at East Lansing and Chatham in 2022. Seeding-year yields from two cuttings at East Lansing are in **Table 21** (page 26). Yield data for individual cuttings from previous years are in the variety test report archive on the MSU Forage Connection website at <http://www.forage.msu.edu/publications>.

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**Table 1. Actual and 30-year average precipitation (Inches) from April to October 2014 to 2022 at two Variety test sites in Michigan.**

	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg ††
<b>East Lansing †</b>										
Apr	1.07	1.10	1.22	5.17	2.18	2.29	2.78	1.49	3.01	<b>3.26</b>
May	3.66	4.83	2.97	2.47	4.96	3.80	4.99	0.94	2.62	<b>3.66</b>
June	5.60	7.23	0.97	2.30	1.60	7.52	2.46	8.40	2.24	<b>3.85</b>
July	2.97	2.89	3.76	2.30	2.18	2.55	2.90	4.72	2.04	<b>2.94</b>
Aug	5.33	6.15	6.83	1.99	4.21	1.16	2.69	6.68	3.97	<b>3.48</b>
Sept	4.49	4.34	3.47	1.26	3.48	3.60	4.09	3.74	2.39	<b>2.81</b>
Oct	2.41	1.92	3.70	8.15	5.66	6.03	2.77	4.99	1.87	<b>3.16</b>
<b>Total</b>	<b>25.53</b>	<b>28.46</b>	<b>22.90</b>	<b>23.64</b>	<b>24.27</b>	<b>26.95</b>	<b>22.68</b>	<b>30.96</b>	<b>18.14</b>	<b>23.16</b>
<b>Chatham †</b>										
Apr	3.32	2.03	3.21	5.25	2.02	2.56	1.91	3.46	5.04	<b>2.44</b>
May	3.36	5.60	3.45	4.99	1.36	5.53	1.60	1.06	2.51	<b>3.27</b>
June	3.85	2.67	2.34	7.36	4.48	2.52	5.11	4.87	3.94	<b>3.37</b>
July	4.27	2.15	3.44	1.74	5.08	1.42	7.65	2.43	1.99	<b>3.58</b>
Aug	3.18	1.86	3.67	5.50	4.32	2.70	3.82	1.75	4.39	<b>3.03</b>
Sept	3.53	2.41	4.78	3.26	5.40	5.08	3.53	3.22	3.77	<b>4.25</b>
Oct	6.98	4.25	6.90	7.82	8.02	7.25	5.29	2.53	4.25	<b>4.74</b>
<b>Total</b>	<b>28.49</b>	<b>20.97</b>	<b>27.79</b>	<b>35.92</b>	<b>30.68</b>	<b>27.06</b>	<b>28.91</b>	<b>19.32</b>	<b>25.89</b>	<b>24.68</b>
† Rainfall from the MSU Plant Soil and Microbial Sciences Agronomy Farm in East Lansing and the Chatham Experiment Station.										
†† Thirty-year (1991 to 2020) averages in the Lansing area and the MSU Experiment Station in Chatham. <a href="https://www.weather.gov">https://www.weather.gov</a>										

In 2022, alfalfa variety trials were cut four times at East Lansing and three times at Chatham. First cutting was removed at early to mid- bloom at both locations in 2022. Alfalfa trial cutting dates at East Lansing were June 4-10, July 8-9, August 17-24, and October 28-30. Cutting dates at Chatham were on June 29, August 4, and October 4. Average total yields in the two established trials with at least 1 full year of data were more than 1.5 tons per acre lower at East Lansing in 2022 than in 2021. Twenty alfalfa varieties seeded in 2019 averaged 5.60 and ranged from 4.79 to 6.01 tons per acre. Second-year total yield from the 2020 seeding averaged 5.86 and ranged from 5.06 to 6.34 tons per acre. A new trial of 13 varieties was established at East Lansing in May of 2021. First-year average total yield in this trial was 4.71 and ranged from 4.29 to 5.02 tons/acre. First cutting of alfalfa at Chatham was 10 days later in 2022 than in 2021. Second cutting was five weeks after first and the third and final cutting was in early October. Yields of alfalfa in 2022 were the highest in several years. Average total yield of nine varieties seeded in 2019 was almost 2 tons more than last year, averaging 5.78 and ranging from 5.27 to 6.24 tons per acre. A new trial of eight alfalfa varieties was seeded at Chatham in early August 2021. First-year average total yield was 4.68 and ranged from 4.16 to 5.00 tons per acre.

#### Perennial Cool-Season Grass Variety Trials

Cool-season grass trials were harvested three times at East Lansing and one or two times at Chatham in 2022. A brief description of grass species with a summary of management recommendations is in **Table 2**. Long-term yield summaries for grass varieties seeded in Michigan trials from 2014 to 2021 are reported in **Tables 7 and 8** (pages 12 and 13). Yields in 2022 from the trials in East Lansing are in **Tables 17 and 18** (pages 20 to 23) and Chatham are in **Table 19** (pages 24 and 25). 2022 seeding-year yields of orchardgrass and perennial ryegrass varieties harvested one time in early November are in **Table 22** (page 26). Dry matter yield of individual cuttings and total in 2022, and the total yield from the previous years are reported. Yield data for individual cuttings from previous years are in the variety test report archive on the MSU Forage Connection website at <http://www.forage.msu.edu/publications>

In 2022, we evaluated perennial grasses in trials seeded in 2020 and 2021 at East Lansing and seeded in 2020 at Chatham. First cutting of the grass trials at both locations was dependent on the date of maturity. In general, first cutting of the bromegrass species were harvested earliest and timothy harvested latest among the grass trials. Harvesting of individual trials, depending

on species, were a few days earlier or about the same dates of the first alfalfa harvest. First harvest dates ranged from May 27 to June 6 at East Lansing and June 15 to July 8 in Chatham. Cutting dates in East Lansing were: cut 1 – May 29 – June 4, cut 2 – July 17-19, and cut 3 – October 16-25. At Chatham, bromegrass (smooth and meadow) was harvested earliest on June 15, the fescue (tall and meadow) and orchardgrass were cut on June 28, and timothy was July 8, much later than the alfalfa harvest. Second cutting of grass at Chatham was on either October 3 or 4. Due to little or no regrowth after first cutting in the 2020 seedings, timothy was cut only one time at East Lansing and Chatham, and smooth bromegrass only once at Chatham.

Yields at East Lansing were not necessarily the highest in the first cutting this year. In the two-year old stand seeded in 2020, percent yield in first cutting of the fescues (tall and meadow), perennial ryegrass, and bromegrass was about 70 percent and the last 2 cuttings accounting for about 30 percent of the total yield. Yield distribution of the orchardgrass varieties, respectively, was 40, 30, and 30 percent in the three cuttings. In the 2021 seeding, Timothy and perennial ryegrass produced almost 75 percent of the three-cut total yield in the first cutting. The yield of tall fescue varieties, however, was more evenly distributed in the three cuttings at 35, 25, and 40 percent, respectively. Yields distribution among cuttings at Chatham were between 65 and 70 percent in first cut for the

fescues, (tall and meadow), and meadow brome grass. Orchardgrass yield was only a little higher in the first than second cut at Chatham.

Second-year yields (seeded in 2020) of orchardgrass, tall fescue, meadow fescue, timothy, smooth brome grass, meadow brome grass, and perennial ryegrass were evaluated at both East Lansing and Chatham. Depending on the species, yields at East Lansing were anywhere from one-third to one-half as much as in 2021. Above average rain in 2021 and the below average rain in 2022 likely contributed to the year-to-year reduction in yield. Meadow and smooth brome grass yields averaged 3.23 and 2.63 tons per acre, respectively, about 1/3 as high as last year. Dry matter yield of orchardgrass averaged 2.91 and ranged from 2.37 to 3.25, tall fescue yields averaged 2.75 and ranged from 1.96 to 3.17, meadow fescue yields averaged 2.49 and ranged from 2.15 to 2.66, and the perennial ryegrass average yield was 1.64 and ranged from 1.51 to 1.90 tons/acre, respectively. Despite only one cutting, timothy yields averaged 2.87 and ranged from 2.63 to 3.24 tons/acre. In the 2021 seeding, first-year yields of tall fescue averaged 2.56 and ranged from 2.32 to 2.86, perennial ryegrass yields averaged 2.42 and ranged from 2.32 to 2.53, and timothy yields averaged 3.36 and ranged from 3.12 to 3.54 tons/acre, respectively. The largest increase in yield at Chatham in 2022 compared to last year was with tall fescue and timothy. Yield of tall fescue averaged 2.49 and ranged from 1.78 to 2.96 tons per acre, almost 2 times more than in 2021. Timothy yields, with one cutting in each year, averaged 2.80 and ranged from 2.61 to 2.83 tons per acre, more than double last year. The other species yields in 2022 were about the same as 2021. Meadow fescue and orchardgrass yields were about 10 percent higher, however, the two brome grass species were 5 to 10 percent lower. Meadow fescue average yield was 2.30 and ranged from 2.06 to 2.48, orchardgrass average yield was 1.55 and ranged from 1.16 to 1.76 tons/acre, respectively.

Grass varieties may be marketed as early, medium, or late maturing. Grass maturity should be matched to legume maturity when planting in mixtures. Plant maturity dates for first cutting in 2022 are reported in **Table 9** (page 14). The date of maturity is determined to be when 50% of the flowering tillers have a head that has cleared the flag leaf. A variety that does not reach 50% heading on or before the harvest date is listed as vegetative.

### Red Clover Variety Trials

Red clover is a short-lived perennial legume that is well-adapted to Michigan. It is used for hay, haylage, pasture, and cover cropping. It is among the most shade tolerant legumes and is easy to establish by conventional methods and frost-seeding. Red clover trials are conducted using the same methods as the alfalfa tests, but for a shorter time period. New red clover varieties have been persisting longer than the 'common' varieties and in some instances are productive in

the third year. Two established red clover trials were evaluated for yield in 2022. The 2020 seeding was not cut in the seeding year but cut 3 times per year in 2021 and 2022. The 2021 seeding was harvested two times in the seeding year and four times in 2022. The cutting dates in 2022 were: June 4-6, July 7-9, August 17-22, respectively, and cut four was on October 30 in the 2021 seeding. Yields of red clover varieties in the 2020 seeding averaged 3.71 and ranged from 2.35 to 4.37 tons per acre, and averaged 4.58, ranging from 4.38 to 4.70 tons per acre with four cuttings in the 2021 seeding. Yields, per cut and total, of the varieties in the two established red clover trials in 2022 are in **Tables 15 and 16** (page 19). A new red clover variety trial was established in 2022 at East Lansing and yields with two cuttings are listed in **Table 20** (Page 26).

### Annual Forage Trials

#### Annual, Italian, and Intermediate Ryegrass

Annual grass trials were established in 2021 and 2022 at East Lansing. These trials are planted in plots 5 ft wide by at least 20 ft long. Harvest area is from the center 3 ft (6 rows) of each plot. Weed control with a herbicide was not needed in these trials and both were fertilized with 50 lbs/acre N prior to first cutting and after each cutting. It is common to harvest the annual ryegrass trials two to three times in the seeding year and at least two times in the following year. In the past trials, regrowth after the second cutting in the second year have not been enough to cut again. Two Italian ryegrass varieties were seeded in 2021 and harvested three times in the seeding year and twice in 2022. Total yields in 2021 and 2022, respectively, averaged 2.41 and 2.90 tons per acre. Eight varieties of ryegrass (annual, Italian, or intermediate) were seeded in 2022 and harvested 3 times in the seeding year. Total yield averaged 2.23 and ranged from 1.82 to 2.87 tons per acre. These varieties will be evaluated for winter survival in 2023 and surviving varieties will be harvested for yield. Yields of the varieties in the two trials are in **Tables 23 and 24** (page 27).

#### Winter Small Grain Forage

Winter small grain variety trials of rye, hybrid rye and triticale have been conducted at East Lansing for the past 4 years. A trial was seeded in September 2021. The fall growth was more than previous years and winter conditions were harsher at times in 2022 than in previous years. This was the first year of substantial winter injury of some of the varieties. Winter survival and plant vigor notes in 2022 helped differentiate between varieties that may not be hardy enough for a south-central Michigan winter. Conditions during May allowed for harvests of individual varieties or plots to occur when desired and not delayed due to rain or wet soil conditions. The ideal harvest timing of the hybrid rye and triticale for forage is prior to heading. The goal in 2022 was to harvest at or near Feekes stage 10.0 to 10.1, just before the

head emerges. Rye varieties matured earlier than the hybrid rye, which was a few days earlier than triticale. The rye and hybrid rye varieties were harvested on May 11 to May 13, and triticale varieties were harvested on May 17 and May 20. Yields of the rye and hybrid rye varieties averaged 2.38 and ranged from 1.79 to 2.82 tons/acre. Dry matter yields of winter triticale varieties averaged 2.84 and ranged from 2.46 to 3.21 tons/acre. Harvest date, winter survival, plant vigor of surviving plants, plant height at harvest, yield, and percent moisture at harvest are listed in **Table 25** (page 28).

### Sorghum, Sorghum-Sudangrass and Forage Sorghum

Two separate trials of sudangrass and forage sorghums were established in 2022. Eleven varieties of either sorghum-sudangrass hybrids or sudangrass were planted in a multi-cut trial and six varieties of either sorghum-grass or forage sorghum were planted in a single harvest trial. The varieties of sorghum-sudangrass and sudangrass were seeded at 30 pounds and the forage sorghum was seeded at 10 pounds per acre. All varieties were planted in 7.5-inch rows using a research cone planter. Both trials were planted on June 13 at East Lansing. The multi-cut trial was harvested on August 10 and on September 27, a few days before an anticipated frost. The single-cut trial was harvested on September 1, a few days after a heavy wind that resulted in some minor lodging/leaning of a couple of the varieties. Maturity notes, plant height, yield, and harvest dry matter percent for both harvests of the multi-cut trial and single-cut trials are in **Tables 26 and 27** (page 29).

#### Berseem Clover

Berseem clover is a nitrogen fixing clover and many varieties grow as annuals and do not overwinter in Michigan. Some of the newer varieties of berseem clover have demonstrated an ability to survive winter in southern Michigan. Six varieties of Berseem clover were planted in May 2022. These varieties were seeded in 5 ft wide plots by 20 ft long. Weed pressure was evaluated and quantified at each of the first 2 cuttings. Weeds were predominantly annual broadleaf in the first cutting and annual grass in the second cutting. Typically, many varieties of berseem clover planted in the spring may be harvested 2 or 3 times in the seeding year. Varieties will be evaluated for winter survival in the spring 2023. Total biomass yield, clover yield, percent clover, and total clover yield of the six varieties are listed in **Table 28** (page 30).

### Forage Species Information

A summary of characteristics and management recommendations for tested forage species are included in **Table 2**. Appropriate species and variety selection depends on location, desired stand life, cutting management, yield goal, and forage quality goal. When selecting a forage to plant on a particular site, first consider adaptation of the *species* to the conditions of the proposed site and intended use as hay/haylage or pasture. Only then should individual varieties and desired yield come under consideration. For more details on individual

forage species, see MSUE Bulletin E-3309, [\*Recommended Hay and Pasture Species for Michigan\*](#).

## Alfalfa

Michigan State University has evaluated more than 80 commercially available alfalfa varieties in its alfalfa variety trials since 2014. Plant breeders, developers, and marketers submit alfalfa varieties for evaluation. Varieties seeded in these trials are evaluated for yield and persistence for three full years after the seeding year. Because glyphosate is used for weed control in Roundup-Ready trials, these are conducted as separate tests from conventional varieties. Vernal, a highly fall-dormant (FD 2) public variety released in 1953 has poor disease resistance compared to modern varieties, is used as the historical check variety to maintain long-term comparisons across time. An index value for variety yield as a percent of Vernal is presented for each conventional alfalfa entry. Because there is no industry standard check variety with the RR trait, index values in RR alfalfa tests are presented as a percentage of the test average.

### Alfalfa Trait Ratings.

Ratings for plant traits are shown in **Table 3**. *Roundup Ready* (RR) varieties are resistant to the herbicide glyphosate (Roundup and many other trade names) which can simplify weed control during the critical alfalfa establishment phase.

### Fall Dormancy and Winterhardiness Ratings.

*Fall dormancy* (FD) ratings are determined by the amount of regrowth after a mid-September cutting. They depend on alfalfa response to daylength and temperature and are useful as an indicator of growth rate potential after cutting or winter dormancy. Moderately dormant (FD = 5) varieties grow earlier in spring and later in fall, grow back faster at every cutting, mature a few days earlier, and often yield more than dormant (FD = 3-4) or very dormant (FD = 1-2) varieties in the East Lansing test. The yield advantage of FD5 is much less at the Lake City and UP test locations but tested FD5 varieties with adequate WSI have been persistent in our northern tests. Non-dormant alfalfa varieties (FD = 6-11) are not recommended for use in Michigan except as an annual or cover crop where survival for more than one growing season is not expected.

*Winter survival index* (WSI) is the preferred rating system for evaluating winterhardiness of alfalfa varieties. A lower WSI value indicates better winterhardiness, and WSI of 1-2 is recommended for Michigan. Within a FD rating, varieties can differ considerably for winter survival index (WSI). The FD and WSI ratings for varieties in the Michigan tests are given in **Table 3**.

### Alfalfa Disease and Pest Ratings.

An alfalfa variety consists of a population of plants which are genetically different from each other. Varieties are described according to the

mean response of all plants, such as average yield, and as a frequency of certain types of plants, such as the percentage of plants resistant to some pest or disease. Thus, even in a "resistant" variety, only a portion of the plants will be resistant. Moderate resistance, for example, means that 15 to 30% of the established plants are resistant, leaving 70 to 85% susceptible. Therefore, a variety classified as resistant may still suffer damage from a disease, especially in the seedling stage. Moderate resistance is generally considered adequate for good alfalfa production. A list of disease resistance ratings for varieties evaluated at MSU is provided in **Table 3**. Additional information and photos of alfalfa diseases can be found at <http://www.alfalfa.org/pdf/AlfalfaAnalyst.pdf>.

**Bacterial Wilt (BW).** BW is present in all of Michigan. All of the named varieties sold in Michigan are adequately resistant to BW.

**Phytophthora Root Rot (PRR).** This fungal disease, first found in Michigan in 1972, is now one of the state's most important alfalfa diseases. PRR occurs primarily on heavy or poorly drained soils, but any soil may result in severe injury if saturated for seven to ten days, especially to one- to two-month old seedlings. Planting seed treated with *Apron* or *Stamina* may further reduce disease when planting resistant varieties. Treating a susceptible variety, such as Vernal, with a seed fungicide is unlikely to compensate for susceptibility. Most of the highest yielding varieties entered in our tests are resistant to PRR.

**Anthracnose (AN).** This disease was first found in Michigan in 1976. It occurs during hot, moist summers and is most common in the southern third of Lower Michigan. The fungus infects stems and crowns and may kill some plants. We recommend that only anthracnose resistant varieties be planted in Michigan.

**Verticillium Wilt (VW).** First detected in Michigan in 1982, VW has not increased in severity as expected. It is generally introduced with infected seed and is usually not a problem until the third year, and then primarily in the first cutting. Growing alfalfa in rotation with corn will help break the disease cycle.

**Aphanomyces (APH).** *Aphanomyces euteiches* is a soil-borne fungus that is similar to PRR and thrives in cool-moist conditions. It can kill or severely stunt young seedlings and causes a chronic root disease in established plants. Seedlings infected with APH will have yellow leaves (chlorosis) and gray roots and stems. There are three races of APH. Race 1 and 2 are confirmed to be present in Michigan. Alfalfa resistant to race 2 is also resistant to race 1; however, resistance to race 1 does not infer resistance to race 2. Resistance to APH should be considered when establishing alfalfa in poorly drained areas. *Apron* does not control APH, but *Stamina* may be helpful.

**Stem nematode (SN).** *Ditylenchus dipsaci* is a microscopic pest that can become a problem in

areas where alfalfa is grown for many years. Symptoms of nematode damage include stunted plants and club-like stems. Crop rotation is the best method for controlling stem nematode.

### How to Select an Alfalfa Variety for Michigan.

Appropriate variety selection depends on location, desired stand life, cutting management, yield goal, and forage quality goal. Location matters because fewer cuttings are possible in shorter growing seasons. Intensive six-cut systems are possible in southernmost counties, but it is rarely practical to get more than three cuts in the Upper Peninsula. Regardless of location, there is always a tradeoff between number of cuttings and stand persistence. More cuttings per year means shorter harvest intervals that result in greater forage quality and greater cumulative yield for the first three to four years. The tradeoff is reduced stand life because of stress on roots. Varieties chosen for short-term, intensively managed stands in Michigan (three to four years) should be: dormant to moderately dormant (FD=4-5), winterhardy (WSI rating 1 to 2), high yielding, and resistant to bacterial wilt (BW) and anthracnose (AN). Resistance to phytophthora root rot (PRR) is also recommended when alfalfa is grown on damp, fine-textured soils. For stand life longer than four years or for Northern Michigan and UP regions, select dormant (FD = 2-4), winterhardy (WSI 1 to 3) varieties with high yields and resistance to BW, AN, PRR, and VW. Keep in mind that the reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

### Perennial Cool-Season Grasses

A brief description of grass species with a summary of management recommendations is in **Table 2**. When selecting a grass variety, first consider adaptation of the *species* to the conditions of the proposed site and intended use as hay/haylage or pasture. Only then should individual varieties and desired yield come under consideration. The reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

Perennial cool-season grasses are evaluated for yield and persistence. Commercially available and experimental entries of orchardgrass, tall fescue, meadow fescue, timothy, perennial ryegrass, Kentucky bluegrass, and festulolium have been seeded in trials at the three locations. More than 50 varieties have been evaluated at East Lansing and more than 25 varieties have been planted at Lake City or Chatham. Nitrogen fertilizer is applied at green-up in early April and after each cutting.

**Orchardgrass** (*Dactylis glomerata* L.) is a high-yielding, competitive, perennial bunchgrass that grows more rapidly than most other Michigan forages in the early spring. Orchardgrass grows well on a wide range of soil types, but is not well



suited for wet sites. Orchardgrass has similar nutritive characteristics to timothy and smooth brome, and is often grown together with alfalfa. Because orchardgrass matures earlier than alfalfa, late-maturing varieties of orchardgrass are preferred when the two are grown in mixture.

**Bromegrasses** (*Bromus spp.*) are rhizomatous, sod-forming grasses that are high in forage quality and yield. **Smooth bromegrass** is one of the most winter-hardy grasses in Michigan and can be grown on a wide range of soil types. Smooth bromegrass has poor regrowth potential, producing most of its yield in the first cutting, and it should not be grazed or cut during stem elongation or early heading to prevent a reduction in tillering. **Meadow brome** has better regrowth potential and heat tolerance than smooth brome. Crosses between smooth and meadow brome, sometimes called **Intermediate Brome**, are intended to have the best traits of both parents.

**Timothy** (*Phleum pratense* L.) is a bunchgrass that forms an open sod and persists well under poorly drained conditions. It is best known for its winterhardiness and ability to survive under ice sheeting. Timothy is a late-maturing grass that traditionally produces most of its yield in the first cutting and requires a long rest period after harvest, making it undesirable for harvest

systems with more than two cuttings. Newer timothy varieties are bred for better regrowth potential and earlier maturity.

**Fescues** (*Schedonorus spp.*) are sod-forming grasses with good seasonal growth distribution, and especially good fall growth. Tall fescue is persistent under frequent short grazing, heavy traffic, heat, drought, and poor drainage on a range of soil types, but has less cold tolerance for Northern Michigan than many other grasses. Tall fescue naturally contains an endophytic fungus that aids plant stress tolerance, but produces alkaloids toxic to livestock eating the forage. Many new varieties of **tall fescue** are endophyte-free or contain “friendly” novel endophytes that are not toxic to animals. Tall fescue varieties containing the toxic wild-type endophyte (E+) are not recommended for Michigan. **Meadow fescue** has better forage quality, palatability, and cold tolerance than tall fescue and does not contain toxic endophytes, but usually yields less.

**Ryegrasses** (*Lolium spp.*) are sod-forming bunchgrasses that are noted for extremely high forage quality and good regrowth potential. **Perennial ryegrass** is suitable for rotational grazing and multiple harvests for haylage, but it lacks the winterhardiness of many other grasses in Michigan, will go dormant under hot, dry conditions, and is difficult to dry as hay

because of its waxy leaf cuticle. It requires high fertility and performs best under irrigation in Michigan. **Annual (Westerwold)** and **Italian ryegrasses** are short-lived species that differ from each other primarily in vernalization requirement for flowering. Italian ryegrass requires a cold period to initiate heading and annual ryegrass does not. Italian and annual ryegrasses are generally similar to perennial ryegrass in adaptation and use characteristics, except that many varieties are not winterhardy in Michigan.

**Festuloliums** (*Schedonorus x Lolium spp.*) are crosses between a fescue (meadow or tall fescue) and a ryegrass (perennial or Italian ryegrass), thus combining the persistence and productivity of fescue with the palatability and nutritive quality of ryegrass. The large number of possible parent combinations results in a great range of appearance, yield and quality characteristics among festulolium varieties—some resemble fescue while others resemble ryegrass.

**Kentucky bluegrass** (*Poa pratensis* L.) is a relatively short-statured, sod-forming perennial grass that is very palatable when vegetative. It persists under frequent, close grazing and is very winter hardy in Michigan, but is unpalatable when heading and quickly goes dormant under hot, dry summer conditions. Because of low yield potential, Kentucky bluegrass is more suitable for grazed than harvested forage systems.

Table 2. Planting specifications and site/use suitability of tested forage species in Michigan

	Seeding rate (lb/acre) †	Seeds/lb (approx.)	Ease of establishment	Stand life (yr)	Acid	Wet	Drought	Cold	Heat	Pasture	Hay
PERENNIALS											
Alfalfa	12-16	213,000	Easy	3-5+	5††	5	2	1	2	2	1
Red Clover	8-12	262,000	Easy	2	4	2	4	1	3	2	2
Brome, meadow	15-20	93,000	Fair	5+	3	5	2	1	-	2	2
Brome, smooth	12-15	139,000	Slow	5+	2	5	2	1	2	2	1
Fescue, meadow	15-20	280,000	Easy	3-4	2	2	4	1	4	1	1
Fescue, tall	12-15	218,000	Easy	5+	1	2	1	3	1	1	1
Festulolium	20-30	207,000	Easy	2-3	3	2	3	2	5	1	3
Kentucky bluegrass	8-15	2,056,000	Easy	5+	2	3	5	1	5	1	5
Orchardgrass	10-12	536,000	Easy	3-5	3	3	2	2	3	2	1
Reed canarygrass	6-8	509,000	Slow	5+	2	1	1	1	3	3	2
Ryegrass, Annual/Italian	20-30	209,000	Easy	1	2	2	5	*	5	1	4
Ryegrass, perennial	20-30	278,500	Easy	2-5	2	2	5	4	5	1	5
Timothy	6-8	1,119,000	Easy	5+	2	2	5	1	3	3	1
ANNUALS											
Berseem clover	8-25	207,000	Easy	1-2	3	2	1	*	1	1	1
Teff grass	6-10	1,226,000	Fair	1	3	2	2	5	1	4	1
Oats	64-80	17,800	Easy	1	1	3	4	4	4	1	1
Rye	60-120	17,000	Easy	1	1	3	2	1	4	1	1
Triticale	50-120	16,000	Easy	1	1	3	2	1	4	1	1

†Use lower end of range for drilling and higher end for broadcasting. Reduce rates proportionately when planting in mixtures.

††Suitability Rating: 1=excellent, 2=very good, 3=average, 4=fair, 5=poor, \* = variety-dependent.

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Table 3. Fall dormancy (FD), winter survival index (WSI), and disease resistance ratings for alfalfa cultivars in MSU variety trials																
Variety	FD †	WSI ††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
1041-2	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Albert Lea
428RR	4	1	HR	HR	HR	HR	HR	HR	-	MR	RR	-	H	G	-	Allied Seed
430 RR LH	4	2	HR	HR	HR	HR	HR	HR	-	MR	RR	HR	H	-	-	Farm Science
6424R	4	2	HR	HR	HR	HR	HR	HR	HR	R	RR	-	H	-	-	NEXGROW
6497R	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	NEXGROW
9200 RR	4	1.5	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	LG Seeds
9401	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Albert Lea
Ace	4	1.5	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Brett Young
AFX 429	3	-	HR	HR	HR	HR	HR	HR	R	R	-	-	L	-	-	Alforex Seeds
AFX 469	4	-	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	G	-	Alforex Seeds
AFX 460	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	-	Alforex Seeds
AmeriStand 403T Plus	4	2	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	America's Alfalfa
AmeriStand 455TQ RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	America's Alfalfa
Armour	4	2	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	Becks Hybrids
Bison	4	2	R	R	R	R	R	R	-	-	-	-	-	-	-	Thomas Ag Services
Caliber	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	-	-	-	Becks Hybrids
CavalryDQ	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Becks Hybrids
Contender	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Becks Hybrids
DG 4210	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Crop Production
DKA40-51RR	4	1	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Dekalb
DKA41-18RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Dekalb
DKA44-16RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Dekalb
DKA43-22RR	4	2	HR	HR	HR	HR	HR	HR	R	HR	RR	-	H	-	-	Dekalb
Emerald	4	1	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	TriCal
Enduro Elite	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Cisco Seeds
FF42.A2	4	1.9	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	La Crosse
FF42.A3	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	DLF USA
Finch	5	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Blue River Organics
Fierce	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Becks Hybrids
Fortune	4	-	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	DLF USA
FSG 415 BR	4	2	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Farm Science
FSG 426	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	Farm Science
GA 409	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Pref Alfalfa Gen
GA 497 HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Pref Alfalfa Gen
Hi-Gest 360	3	1.5	HR	HR	HR	HR	HR	HR	HR	R	-	-	M	G	-	Alforex Seeds
HybriForce 3400	4	1.5	HR	HR	HR	HR	HR	HR	MR	HR	-	-	-	-	-	Dairyland Seeds
HybriForce 3420/Wet	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Dairyland Seeds
HybriForce 3430	4	-	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Dairyland Seeds
HybriForce 4400	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Dairyland Seeds
HybriForce 4420/Wet	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Dairyland Seeds
Integra 8420	4	-	HR	HR	HR	HR	HR	HR	HR	HR	-	-	M	-	-	Wilbur-Ellis
Integra 8450	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Wilbur-Ellis
Integra 8444R	4	-	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	M	G/F	-	Wilbur-Ellis
KF406A2	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KF425HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
L-455HD	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Legacy Seeds
L-451APH2+	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Legacy Seeds
Magnum 7 WET	4	1.6	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Dairyland Seeds
Mariner IV	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Allied Seed
Mariner V	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Allied Seed

Table 3 continued next page

Table 3 continued

Variety	FD †	WSI††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
Octane	3	1.4	HR	HR	HR	HR	HR	HR	HR	-	-	-	L	-	-	Brett Young
Oneida VR	3	-	R	MR	MR	HR	HR	-	-	-	-	-	-	-	-	Public
54Q14	4	1	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	Pioneer
54Q16	4	-	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Pioneer
54Q29	4	2	HR	HR	HR	HR	R	HR	HR	HR	-	-	-	-	-	Pioneer
55Q27	5	1	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Pioneer
54VQ52	3	-	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	Pioneer
55H96	5	-	HR	HR	HR	R	HR	HR	HR	-	-	HR	-	-	-	Pioneer
55V50	5	-	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	Pioneer
55QR04	4	1	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Pioneer
55VR06	5	1	HR	HR	HR	HR	R	HR	MR	MR	RR	-	-	-	-	Pioneer
55VR08	5	-	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Pioneer
54VR10	4	-	HR	HR	HR	HR	R	HR	HR	R	RR	-	-	-	-	Pioneer
Quail	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Blue River Organics
QuickGold	5	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Renk Seed
Rebound 6XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	CropLan Genetics
RR AphaTron 2XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	RR	-	H	G	-	CropLan Genetics
RR Stratica	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Croplan Genetics
RR501	5	2	HR	HR	HR	-	HR	HR	-	HR	RR	-	H	G/F	-	Channel
Signature	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Allied Seed
StarGold	5	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Renk Seed
Stalwart II	5	1.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	LG Seeds
Swift	4	2	HR	HR	HR	HR	R	R	MR	HR	-	-	-	-	-	Blue River Organics
SW 3407	3	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 4107	4	-	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 4412Y	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	S&W Seeds
SW 4506	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 5213	5	-	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	S&W Seeds
SW 5509	5	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	S&W Seeds
SW 5511	5	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 5615	5	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	Mountain View Seed
TriFecta	5	2	HR	HR	HR	HR	R	HR	HR	MR	-	-	-	-	-	TriCal
TriFecta III	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	-	Seed Logic
Triad	5	2.5	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Albert Lea
Vernal	2	2	R	S	S	S	MR	S	-	S	-	-	-	-	-	Public
Viking 374HD	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Albert Lea
Viking 394AP	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Albert Lea
WL 349 HQ	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	W-L Research
WL 354 HQ	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	W-L Research
WL 365 HQ	5	1	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	W-L Research
WL 356 HQ RR	4	1	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	H	G	-	W-L Research
WL 372 HQ RR	5	2	HR	HR	HR	HR	HR	HR	-	HR	RR	-	-	-	-	W-L Research
Yieldmaster RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Monsanto

† Refer to Alfalfa Trait Ratings found in the summary for more information

†† Winter survival index : 1=superior winter survival, 2=very good, 3=good, 4=adequate, 5=low, 6=no winter survival.

‡ BW = Bacterial Wilt, PRR = Phytophthora Root Rot, AN = Anthracnose, VW = Verticillium Wilt, FW = Fusarium Wilt, APH 1 = Aphanomyces race one, APH 2 = Aphanomyces race two, SN=Stem nematode, RR = Roundup Ready® Alfalfa Variety, PLF = Potato leafhopper resistance, Multi = Multifoliate leaf expression (H-High, M-Medium, L-Low), Salt = Salt tolerance (G = germination, F = Forage), Stand = Standability or lodging resistance.



Table 4. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials. Seeded in East Lansing, Michigan from 2014 to 2021

Variety	Marketer	Three-year average ‡						2-year average	1-year total	(Trials) †
		2014	2015	2016	2017	2018	2019	2020	2021	%
		(2015-17)	(2016-18)	(2017-19)	(2018-20)	(2019-21)	(2020-21)	(2021-22)	(2022)	Vernal ††
----- dry matter tons/acre -----										
1041-2	Albert Lea	-	-	-	-	-	5.97	-	-	(1)109
9401	Albert Lea	-	-	-	-	-	5.62	-	-	(1)103
Ace	Brett Young	-	-	-	-	5.01	-	-	-	(1)99
AFX 429	Alforex Seeds	-	-	-	4.56	-	-	-	-	(1)105
AFX 460	Alforex Seeds	-	-	-	4.77	5.16	-	-	-	(2)106
AFX 469	Alforex Seeds	-	-	-	4.75	-	-	-	-	(1)110
Bison	Thomas Ag Services	-	-	-	-	-	-	-	4.60	-
Caliber	Becks Hybrids	5.81	4.33	-	-	-	-	-	-	(2)110
CavalryDQ	Becks Hybrids	-	5.02	-	4.67	-	-	-	-	(2)118
Contender	Becks Hybrids	5.80	4.64	-	-	-	-	-	-	(2)114
Emerald	TriCal	-	-	-	-	5.23	-	-	-	(1)104
Enduro Elite	Cisco Seeds	5.73	-	-	-	-	-	-	-	(1)109
FF42.A2	Allied Seed	-	5.05	-	-	-	-	-	-	(1)128
FF42.A3	DLF USA Inc	-	-	-	-	-	-	-	4.59	-
Fierce	Becks Hybrids	5.86	4.94	-	4.49	-	-	-	-	(3)114
Finch	Blue River Organic	-	-	-	-	-	5.82	-	-	(1)107
Fortune	DLF USA Inc	-	-	5.34	-	-	-	-	-	(1)120
FSG 415 BR	Farm Science	-	5.33	-	-	-	-	-	-	(1)136
FSG 426	Farm Science	-	4.74	-	-	-	-	-	-	(1)121
GA-409	Preferred Alfalfa Gen	5.79	-	-	-	-	-	-	-	(1)110
GA-497HD	Preferred Alfalfa Gen	-	-	5.23	-	-	-	-	-	(1)118
HybriForce 3400	Dairyland Seed	-	4.73	-	-	-	-	-	-	(1)120
HybriForce 3420 Wet	Dairyland Seed	-	-	5.41	-	-	-	-	-	(1)122
HybriForce 3420/Wet-OB1	Osprey Biotechnics	-	-	5.46	-	-	-	-	-	(1)123
HybriForce 3420/Wet-OB2	Osprey Biotechnics	-	-	5.83	-	-	-	-	-	(1)131
HybriForce 3430	Dairyland Seed	-	-	5.49	-	-	-	-	-	(1)123
HybriForce 4400	Dairyland Seed	-	4.94	5.48	5.19	5.85	5.96	6.79	4.92	(6)118
HybriForce 4400-OBT2002	Osprey Biotechnics	-	-	-	-	5.80	-	-	-	(1)115
HybriForce 4400-OBT2013	Osprey Biotechnics	-	-	-	-	5.63	-	-	-	(1)111
HybriForce 4420/Wet	Dairyland Seed	-	-	-	-	-	6.16	6.80	5.02	(2)113
Integra 8420	Wilbur-Ellis	-	-	5.47	-	-	-	-	-	(1)123
Integra 8450	Wilbur-Ellis	-	-	5.54	-	-	-	-	-	(1)124
KF406A2	Byron Seed	-	-	5.31	-	-	-	-	-	(1)119
KF425HD	Byron Seed	-	-	5.37	-	-	-	-	-	(1)121
L-451APH2+-FL1	Legacy/Osprey	-	-	-	-	-	6.12	-	-	(1)112
L-451APH2+-FL2	Legacy/Osprey	-	-	-	-	-	6.19	-	-	(1)113
L-451APH2+ANS	Legacy/Osprey	-	-	-	-	-	6.06	-	-	(1)111
Oneida VR	Public	5.33	-	4.68	-	-	-	-	-	(2)103
54Q14	Pioneer	5.54	-	-	-	-	-	-	-	(1)106
54Q16	Pioneer	-	-	-	-	-	-	-	4.64	-
54VQ52	Pioneer	-	-	-	-	-	-	-	4.76	-
54VR10	Pioneer	-	-	-	-	-	-	-	4.78	-
55Q27	Pioneer	6.13	4.96	5.22	-	-	-	-	-	(3)120
55H96	Pioneer	-	-	-	-	-	-	-	4.37	-
Quail	Blue River Organic	-	-	-	-	-	5.60	-	-	(1)103
QuickGold	Renk Seed	-	-	-	-	5.15	-	-	-	(1)102
Rebound 6XT	Croplan Genetics	-	-	5.10	-	-	-	-	-	(1)115
Stalwart II	LG Seeds	-	-	5.14	-	-	-	-	-	(1)116
StarGold	Renk Seed	6.17	-	-	-	-	-	-	-	(1)118
SW 3407	S & W Seed Company	-	-	-	-	-	6.16	6.83	-	(2)113
SW 4107	S & W Seed Company	-	-	-	4.91	5.54	5.73	6.86	-	(4)111
SW 4412Y	S & W Seed Company	-	-	-	-	-	-	6.80	-	(1)113
SW 4506	S & W Seed Company	-	-	-	-	-	-	6.74	-	(1)112
SW 5213	S & W Seed Company	-	-	5.51	-	-	-	-	-	(1)124
SW 5509	S & W Seed Company	-	-	-	-	-	-	6.74	-	(1)112
SW 5511	S & W Seed Company	-	-	-	-	-	5.84	-	-	(1)107
SW 5520Y	S & W Seed Company	-	-	-	-	-	-	-	4.90	-
SW 5517	S & W Seed Company	-	-	-	-	-	-	-	4.92	-
SW 5614	S & W Seed Company	-	-	-	-	-	-	-	4.72	-
SW 5615	Mountain View Seed	-	-	-	-	-	-	-	4.77	-
Triad	Albert Lea	-	-	-	-	-	5.52	-	-	(1)101
TriFecta	TriCal	-	-	5.52	-	5.66	-	-	-	(2)118
Trifecta III	Seed Logic	-	-	-	-	5.48	-	-	-	(1)109
Vernal	public	5.25	3.93	4.45	4.33	5.05	5.46	6.01	4.29	-
WL 365HQ	W-L Research	-	-	5.32	-	-	-	-	-	(1)120
WL 349HQ	W-L Research	-	-	-	-	-	5.79	-	-	(1)106
Mean		5.74	4.78	5.31	4.71	5.49	5.87	6.70	4.71	114

† Number of 3-year trials with at least 2 years of data after the seeding year.

†† Average % Vernal of varieties with more than 2 full years of yield data

‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 5. Yields of Alfalfa Varieties (dry matter tons/acre) seeded from 2014 to 2021 at Chatham in the Upper Peninsula and from 2014 to 2016 at Lake City in Northern Lower Michigan.

Variety	Marketer	Chatham					Lake City			
		3-yr average ‡			Total 2021 (2022)	(Trials) † %	3-yr average ‡			(Trials) † %
		2015 (2016-18)	2018 (2019-21)	2019 (2020-21)			2014 (2015-17)	2015 (2016-18)	2016 (2017-19)	
		----- dry matter tons/acre -----					--- dry matter tons/acre ---			
1041-2	Albert Lea	-	-	5.24	-	(1)114	-	-	-	-
9401	Albert Lea	-	-	4.97	-	(1)110	-	-	-	-
AmeriStand 403T Plus	America's Alfalfa	3.29	-	-	-	(1)105	3.18	4.36	-	(2) 96
Bison	Thomas Ag Service	-	-	-	4.16	-	-	-	-	-
DG 4210	Crop Production	3.28	-	-	-	(1)104	3.35	4.53	-	(2)100
Hi-Gest 360	Alforex	-	-	-	-	-	3.40	-	-	(1) 97
HybriForce 3400	Dairyland Seed	3.45	4.58	-	-	(2)109	3.65	4.91	-	(2)109
HybriForce 4400	Dairyland Seed	-	4.55	4.75	4.64	(2)105	-	-	-	-
HybriForce 4420/Wet	Dairyland Seed	-	-	-	4.76	-	-	-	-	-
Integra 8420	Wilbur-Ellis	-	4.39	-	-	(1)103	-	-	3.48	(1)103
Integra 8450	Wilbur-Ellis	-	4.45	-	-	(1)104	-	-	3.44	(1)102
L455HD	Legacy	3.20	-	-	-	(1)102	3.83	4.48	-	(2)106
Magnum 7 WET	Dairyland	3.13	-	-	-	(1)100	3.62	4.67	-	(2)105
Mariner IV	Allied Seed	3.14	-	-	-	(2) 99	3.81	4.76	-	(2)109
Octane	Brett Young	-	-	-	-	-	3.46	-	-	(1) 99
Oneida VR	Public	3.13	-	-	-	(1)100	3.62	4.63	-	(2)105
54Q14	Pioneer	-	-	-	-	-	3.20	4.45	-	(2) 97
55Q27	Pioneer	3.31	-	-	-	(1)105	3.81	4.48	3.39	(3)104
55V50	Pioneer	-	-	-	-	-	3.79	4.83	-	(2)110
StarGold	Renk Seed	3.27	-	-	-	(1)104	3.48	-	-	(1)100
SW 3407	S & W Seed	-	-	4.88	4.59	(1)102	-	-	-	-
SW 4107	S & W Seed	-	4.17	4.91	4.77	(2)103	-	-	-	-
SW 4412Y	S & W Seed	-	-	-	5.00	-	-	-	-	-
SW 4506	S & W Seed	-	-	-	4.75	-	-	-	-	-
SW 5509	S & W Seed	-	-	-	4.74	-	-	-	-	-
SW 5511	S & W Seed	-	-	4.95	-	(1) 98	-	-	-	-
Swift	Blue River Organic	-	-	4.95	-	(1)107	-	-	-	-
Triad	Albert Lea	-	-	4.33	-	(1) 88	-	-	-	-
Trifecta	TriCal	-	4.39	-	-	(1)103	-	-	-	-
Vernal	Public	3.14	4.27	4.47	-	(3)100	3.49	4.36	3.37	(3)100
WL354HQ	W-L Research	3.08	-	-	-	(1) 98	3.11	-	-	(1) 89
Mean		3.23	4.40	4.83	4.68	102	3.54	4.60	3.42	102

† Number of 3-year trials with at least 2 years of data after the seeding year.

†† Average % Vernal of varieties with more than 2 full years of yield data.

‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 6. Yields of Roundup Ready® Alfalfa Varieties (dry matter tons/acre) seeded from 2013 to 2018 at East Lansing, Chatham, and Lake City, Michigan.

		East Lansing								
Variety	Marketer	Three-year average ††					(Number)			
		2013	2014	2015	2016	2017	%			
		(2014-16)	(2015-17)	(2016-18)	(2017-19)	(2018-20)	Mean †			
----- dry matter tons/acre -----										
428RR	Allied Seed	6.01	-	-	-	-	(1)102			
430RRLH	Allied Seed	-	-	4.16	-	-	(1) 89			
6424R	NEXGROW	-	-	-	-	4.45	(1) 97			
6497R	NEXGROW	5.94	-	-	-	-	(1)101			
9200RR	LG Seeds	-	-	-	4.79	-	(1)101			
AmeriStand 455TQ RR	America's Alfalfa	5.81	-	-	-	-	(1) 99			
Armour	Becks Hybrids	-	-	-	-	4.78	(1)104			
DKA40-51RR	Dekalb	-	5.10	4.80	4.49	-	(3) 98			
DKA41-18RR	Dekalb	5.72	-	-	-	-	(1) 97			
DKA43-22RR	Dekalb	-	5.20	-	-	-	(1)102			
DKA44-16RR	Dekalb	5.99	5.24	4.52	4.75	4.53	(5)100			
Integra 8444R	Wilbur-Ellis	-	-	-	4.61	-	(1) 97			
54QR04	Pioneer	5.98	-	-	-	-	(1)102			
55VR06	Pioneer	-	5.40	5.16	-	-	(2)107			
55VR08	Pioneer	-	-	-	5.01	-	(1)106			
RR AphaTron 2XT	Croplan Genetics	-	-	-	4.81	-	(1)101			
RR 501	Channel	-	5.26	-	-	-	(1)100			
RR Stratica	Croplan Genetics	5.95	-	-	-	-	(1)101			
WL 356HQ.RR	W-L Research	5.96	-	-	-	-	(1)101			
WL 372HQ.RR	W-L Research	5.88	-	-	-	-	(1)100			
Yieldmaster RR	Monsanto	5.70	-	-	-	-	(1) 97			
Mean		5.89	5.24	4.66	4.74	4.59				
		Chatham			Lake City					
Variety		Three-year ††			(Number) % Mean †	Three-year average ††			(Number) % Mean †	
		2013	2015	2018		2013	2014	2015		2016
		(2014-16)	(2016-18)	(2019-21)		(2014-16)	(2015-17)	(2016-18)		(2017-19)
-- dry matter tons/acre --										
6424R		-	-	3.87	(1)101	-	-	-	-	-
DKA40-51RR		-	2.83	3.92	(2) 98	-	2.88	3.59	3.17	(3) 96
DKA41-18RR		3.66	3.14	-	(2)102	2.83	-	3.84	-	(2)100
DKA43-22RR		-	3.11	-	(1)103	-	3.10	4.06	-	(2)104
DKA44-16RR		3.59	3.09	3.85	(3)100	2.85	3.04	3.87	3.23	(4)101
Integra 8444R		-	-	3.75	(1) 97	-	-	-	3.03	(1) 95
54QR04		-	-	-	-	2.84	-	-	-	(1)101
55VR06		-	-	-	-	-	-	3.87	-	(1)101
55VR08		-	-	-	-	-	-	-	3.36	(1)105
RR 501		-	2.93	-	(1) 97	-	-	-	-	-
Yieldmaster RR		3.64	-	-	(1)100	2.75	-	-	-	(1) 98
Mean		3.63	3.02	3.85		2.82	3.01	3.85	3.20	
Trials usually cut 4 times per year at East Lansing, three times per year at Lake City and Chatham.										
† Number of trials at each location with at least 2 full harvest years of data and % of the mean within the trial.										
†† Seeding year and (the years the trial was harvested to obtain the average yield)										

Table 7. Long-term average yields (dry matter tons/acre) of perennial forage grasses seeded from 2014 to 2021 at East Lansing, Michigan.

			Multi-year averages ‡					1-year total	% species mean ††
Sp †	Variety	Marketer	2014 (2015-17)	2016 (2017-19)	2017 (2018-20)	2018 (2019-21)	2020 (2021-22)	2021 (2022)	
----- dm tons/acre -----									
FEST	Becva	DLF USA Inc	2.61	-	-	-	-	-	(1)106
FEST	Barfest	Barenbrug/Best Forage	2.33	-	-	-	-	-	(1) 94
FEST	Hostyn	DLF USA Inc	-	-	-	4.45	-	-	(1)104
FEST	Lofa	DLF USA Inc	-	-	-	4.20	-	-	(1) 99
FEST	Perun	DLF USA Inc	-	-	-	4.12	-	-	(1) 97
<b>FEST</b>	<b>SPECIES MEAN Festulolium (ryegrass type)</b>		<b>2.47</b>	-	-	<b>4.26</b>	-	-	-
FEST	Fojtan	DLF USA Inc	-	3.72	-	-	-	-	(1) 95
FEST	Mahulena	DLF USA Inc	-	4.11	-	-	-	-	(1)105
<b>FEST</b>	<b>SPECIES MEAN Festulolium (fescue type)</b>		-	<b>3.92</b>	-	-	-	-	-
MdF	Cosmonaut	Barenbrug Seed	3.25	-	-	-	-	-	(1)100
MdF	Pradel	Barenbrug/Best Forage	3.25	2.90	3.76	3.81	4.43	-	(5)101
MdF	SW Minto	Albert Lea Seed	-	-	3.49	-	-	-	(1) 96
MdF	Driftless	Barenbrug/Best Forage	-	-	-	3.70	4.28	-	(2) 98
MdF	Raskila	Hood River Seed	-	3.14	-	-	-	-	(1)104
<b>MdF</b>	<b>SPECIES MEAN Meadow Fescue</b>		<b>3.25</b>	<b>3.02</b>	<b>3.63</b>	<b>3.76</b>	<b>4.36</b>	-	-
OR	Ammo	Barenbrug/Best Forage	-	-	-	-	4.58	-	(1) 92
OR	Barlegro	Barenbrug Seed	3.42	-	-	-	-	-	(1)100
OR	Echelon	DLF USA Inc	3.43	4.45	-	-	5.40	-	(3)105
OR	Intensiv	Barenbrug/Best Forage	3.48	-	-	-	5.10	-	(2)102
OR	Inavale	DLF USA Inc	-	-	-	-	5.14	-	(1)103
OR	Lyra	Hood River Seed	-	4.00	-	-	-	-	(1) 96
OR	Lucharm	Albert Lea Seed	-	-	3.70	-	-	-	(1) 99
OR	Lukir	Albert Lea Seed	-	-	3.61	-	-	-	(1) 97
OR	Persist	Smith Seed	3.37	-	-	-	-	-	(1) 99
OR	Potomac	check variety	3.28	4.09	3.92	-	4.68	-	(4) 98
OR	Treposno	Hood River Seed	-	4.09	-	-	-	-	(1) 98
<b>OR</b>	<b>SPECIES MEAN Orchardgrass</b>		<b>3.40</b>	<b>4.16</b>	<b>3.74</b>	-	<b>4.98</b>	-	-
PR	Dexter I (4n)	DLF USA Inc	-	2.89	-	3.04	-	2.42	(2) 97
PR	Garbor (4n)	DLF USA Inc	-	2.69	-	3.19	-	-	(2) 96
PR	Linn (2n)	check variety	2.22	2.72	2.89	2.89	-	-	(5) 93
PR	Mara (2n)	Barenbrug Seed	2.59	-	-	-	-	-	(1) 98
PR	Maximo (4n)	DLF USA Inc	2.54	3.48	-	-	-	-	(2)107
PR	Payday (4n)	Smith Seed	2.96	-	-	-	-	-	(1)112
PR	Tomaso	Albert Lea Seed	-	-	2.69	-	-	-	(1) 91
PR	Remington (4n)	Barenbrug/Best Forage	2.88	-	3.33	3.51	4.27	-	(4)108
PR	Remington NEA (4n)	Barenbrug/Best Forage	-	-	-	-	4.19	2.53	(1) 99
<b>PR</b>	<b>SPECIES MEAN Perennial Ryegrass</b>		<b>2.64</b>	<b>2.95</b>	<b>2.97</b>	<b>3.16</b>	<b>4.23</b>	-	-
SB	Artillery (smooth)	Barenbrug/Best Forage	-	-	-	-	5.73	-	(1) 98
MB	Arsenal (meadow)	Barenbrug/Best Forage	-	-	-	-	5.95	-	(1)102
SB	Lincoln (smooth)	check variety	3.71	-	-	-	5.90	-	(2)102
SB	Hakari (Alaska brome)	Barenbrug Seed	3.33	-	-	-	-	-	(1) 93
SB	MBA (smooth)	DLF USA Inc	3.70	-	-	-	-	-	(1)103
<b>MB/SB</b>	<b>SPECIES MEAN Bromegrass species</b>		<b>3.58</b>	-	-	-	<b>5.86</b>	-	-
TF	Armory	Barenbrug/Best Forage	-	-	-	-	5.59	-	(1)105
TF	BarElite	Barenbrug Seed	4.18	-	-	4.73	-	-	(2) 98
TF	Bariane	Barenbrug/Best Forage	3.72	-	-	4.56	5.05	-	(3) 92
TF	Dominate	Allied Seed	4.50	-	-	-	-	-	(1)106
TF	Cajun II	Smith Seed	4.21	-	-	-	-	-	(1) 99
TF	Florine	Albert Lea Seed	-	-	4.75	-	-	-	(1)100
TF	Kentucky 31 minus	check variety	4.24	4.11	5.06	5.06	-	2.42	(4)103
TF	Ranchero	Smith Seed	-	-	-	5.00	-	-	(1)103
TF	Swaj	Albert Lea Seed	-	-	4.45	-	-	-	(1) 94
TF	STF 43	Best Forage/Cisco	-	-	-	-	-	2.44	-
TF	Tower	DLF USA Inc	4.61	4.01	-	-	-	-	(2)103
<b>TF</b>	<b>SPECIES MEAN Tall Fescue</b>		<b>4.26</b>	<b>4.06</b>	<b>4.75</b>	<b>4.84</b>	<b>5.32</b>	-	-
TM	Barleo	Barenbrug/Best Forage	-	-	-	-	4.95	-	(1)113
TM	Baronaise	Barenbrug/Best Forage	-	-	-	-	4.23	-	(1) 97
TM	Climax	check variety	2.94	3.50	3.58	3.85	3.93	3.12	(5) 91
TM	Dawn	Allied Seed	-	4.00	-	-	-	-	(1)104
TM	Express II	Allied Seed	3.44	-	-	-	-	-	(1)108
TM	KY Early Timothy	Smith Seed	-	-	4.62	4.50	-	-	(2)111
TM	Winnetow	DLF USA Inc	-	-	-	4.01	-	-	(1) 97
TM	Valor	DLF USA Inc	-	-	-	-	-	3.54	-
TM	Zenyatta	DLF USA Inc	-	3.99	-	-	-	3.42	(1)104
<b>TM</b>	<b>SPECIES MEAN Timothy</b>		<b>3.19</b>	<b>3.83</b>	<b>4.10</b>	<b>4.12</b>	<b>4.37</b>	-	-

† FEST=Festulolium (ryegrass or fescue type), MdF= Meadow fescue, OR=Orchardgrass, PR=Perennial ryegrass,

MB/SB Bromegrass species (meadow or smooth), TF= Tall fescue, TM=Timothy

†† Number of trials with at least 2 years data and % of the mean (commercially available varieties)

‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 8. Forage Yield (dry matter tons/acre) of Perennial Forage Grasses Seeded at Chatham in the Upper Peninsula and at Lake City in Northern Lower Michigan.

Sp †	Variety	Marketer	Chatham ‡				Lake City ‡			
			Multi-year average ‡‡‡			% species mean ‡‡	Multi-year average ‡‡‡			% species mean ‡‡
			2014 (2015-17)	2015 (2016-18)	2020 (2021-22)		2014 (2015-17)	2015 (2016-18)	2017 (2018-19)	
			----- dry matter tons/acre -----				---- dry matter tons/acre ----			
MdF	Driftless	Barenbrug/Best Forage	-	-	2.18	(1) 96	-	-	-	-
MdF	Pradel	Barenbrug/Best Forage	-	1.75	2.33	(1)103	-	3.70	3.89	(1)105
MdF	SW Minto	Albert Lea	-	-	-	-	-	-	3.54	(1) 95
<b>MdF</b>	<b>SPECIES MEAN Meadow Fescue</b>		-		<b>2.26</b>		-	-	<b>3.72</b>	-
OR	Ammo	Barenbrug/Best Forage	-	-	1.38	(1) 88	-	-	-	-
OR	Echelon	DLF USA Inc	1.54	-	-	(1) 96	3.20	-	-	(1)103
OR	Intensiv	Barenbrug/Best Forage	1.68	-	1.59	(2)104	3.27	4.09	-	(2)105
OR	Lucharm	Albert Lea	-	-	-	-	-	-	4.18	(1) 99
OR	Lukir	Albert Lea	-	-	-	-	-	-	3.93	(1) 93
OR	Persist	Smith Seed	1.58	-	-	(1) 99	2.97	3.84	-	(2) 97
OR	Potomac	check variety	1.59	1.69	1.71	(2)105	3.02	3.82	4.51	(3)100
<b>OR</b>	<b>SPECIES MEAN Orchardgrass</b>		<b>1.57</b>	<b>1.69</b>	<b>1.56</b>		<b>3.12</b>	<b>3.92</b>	<b>4.21</b>	
PR	Albion (4n)	Cisco Seeds	-	0.72	-	(1) 88	-	3.27	-	(1)107
PR	Linn (2n)	check variety	-	0.98	-	(1)120	-	-	3.60	(1) 99
PR	Mara (2n)	Barenbrug Seed	-	0.80	-	(1) 98	-	2.75	-	(1) 90
PR	Payday (4n)	Smith Seed	-	-	-	-	-	3.15	-	(1)103
PR	Remington (4n)	Barenbrug/Best Forage	-	0.78	-	(1) 95	-	-	-	-
PR	Tomaso (4n)	Albert Lea	-	-	-	-	-	-	3.67	(1)101
<b>PR</b>	<b>SPECIES MEAN Perennial Ryegrass</b>		-	<b>0.82</b>	-		-	<b>3.06</b>	<b>3.64</b>	
SB	Artillery (smooth)	Barenbrug/Best Forage	-	-	1.97	-	-	-	-	-
MB	Arsenal (meadow)	Barenbrug/Best Forage	-	-	2.43	-	-	-	-	-
SB	Lincoln (smooth)	check variety	-	-	1.87	-	-	-	-	-
<b>MB/SB</b>	<b>SPECIES MEAN Bromegrass species</b>		-	-	<b>2.09</b>		-	-	-	-
TF	Armory	Barenbrug/Best Forage	-	-	2.20	(1)104	-	-	-	-
TF	Bariane	Barenbrug/Best Forage	1.53	1.35	2.02	(3) 89	2.79	4.35	-	(2) 97
TF	Florine	Albert Lea	-	-	-	-	-	-	5.54	(1)101
TF	Kentucky 31 Plus	check variety	1.89	1.74	-	(2) 108	3.08	4.19	-	(2)100
TF	Kentucky 31 minus	check variety	1.82	-	-	(1) 101	2.98	4.29	5.47	(3)100
TF	Swaj	Albert Lea	-	-	-	-	-	-	5.39	(1) 99
TF	Tuscany II	Forage First	1.98	-	-	(1) 109	3.11	4.27	-	(2)102
<b>TF</b>	<b>SPECIES MEAN Tall Fescue</b>		<b>1.81</b>	<b>1.55</b>	<b>2.11</b>		<b>2.99</b>	<b>4.28</b>	<b>5.47</b>	
TM	Barfleo	Barenbrug/Best Forage	-	-	2.06	(1)101	-	-	-	-
TM	Baronaise	Barenbrug/Best Forage	-	-	1.94	(1) 96	-	-	-	-
TM	BarPenta	Barenbrug Seed	1.94	-	-	(1) 92	3.12	-	-	(1) 95
TM	Climax	check variety	2.03	1.75	2.10	(3) 97	2.92	4.69	4.68	(3) 95
TM	Crest	Allied Seed	2.19	-	-	(1)103	3.65	-	-	(1)111
TM	KY Early	Smith Seed	-	-	-	-	-	-	4.65	(1)100
TM	Summit	Allied Seed	2.33	-	-	(1)110	3.46	4.75	-	(2)102
TM	Winnetow	DLF USA Inc	-	1.77	-	(1) 94	-	-	-	-
TM	Zenyatta	DLF USA Inc	-	2.16	-	(1)114	-	5.01	-	(1)104
<b>TM</b>	<b>SPECIES MEAN Timothy</b>		<b>2.12</b>	<b>1.89</b>	<b>2.03</b>		<b>3.29</b>	<b>4.82</b>	<b>4.66</b>	

† MdF= Meadow fescue, OR=Orchardgrass, PR=Perennial ryegrass, MB/SB Bromegrass species (meadow or smooth), TF= Tall fescue, TM=Timothy.

‡ Generally, three cuttings per year at Lake City. One or Two cuttings per year at Chatham.

‡‡ Number of trials and % of the mean (released varieties)

‡‡‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 9. First cutting maturity dates in 2022 of the varieties entered in the Perennial Grass Variety Trials at East Lansing in 2020 and 2021.

2020 Perennial Grass Variety Trial					
Tall Fescue		Meadow Fescue		Orchardgrass	
Variety	Date ††	Variety	Date ††	Variety	Date ††
Armory	May 22	BAR FP 2044 †	May 24	Ammo	May 19
7FACF82 †	May 26	BAR FPF 77-2 †	May 25	BAR DGLF 2094 †	May 27
BAR FA 9125 †	May 24	BAR FPF82 †	May 26	BAR DGLF 2095 †	May 28
BAR FAF 135 †	May 26	Driftless	May 26	Echelon	May 24
BAR FAF 137 †	May 26	Pradel	May 24	Inavale	May 22
BAR FAF 146 †	May 24	PST FP-A1747 †	May 26	Intensiv	May 26
BAR FAFL 239 †	May 23	PST FP-A1750 †	May 24	OG 80 †	May 24
Bariane	May 28			OG 96 †	May 26
PST FA-A1733 †	May 25			Potomac	May 19
				PST DG-1739 †	May 22
				PST DG-A1737 †	May 26
Perennial Ryegrass		Smooth Bromegrass		Timothy	
Variety	Date ††	Variety	Date ††	Variety	Date ††
DSV LP-A1901 †	May 27	Artillery	May 23	Barfleo	June 3
DSV LP-A1902 †	May 23	Lincoln	May 23	Baronaise ‡	Veg
PST LP-A1703 † ‡	Veg			Climax ‡	Veg
Remington	June 3				
Remington NEA	June 3				
		Meadow Bromegrass			
		Variety	Date ††		
		Arsenal	May 19		
		Fleet	May 19		

2021 Perennial Grass Trials seeded in East Lansing					
Perennial Ryegrass		Tall Fescue		Timothy	
Variety	Date ††	Variety	Date ††	Variety	Date ††
Remington NEA2	June 3	BAR FAFR 160184 †	May 23	Valor	May 29
Dexter 1	May 28	BAR FAFR 181197 †	May 24	Zenyatta	May 28
Bar LP237 † ‡	Veg	STF 43	May 25	Climax ‡	Veg
		BAR FAFR 184270 †	May 23		

† Experimental entry - not commercially available.

†† Maturity Date - Date when 50% of reproductive tillers have a fully emerged grass head that is clear of the flag leaf.

‡ Varieties listed as vegetative or boot had not reached maturity on the date of harvest.



**Table 10.** Michigan State University Alfalfa Variety Trial Yields (DM tons/acre), MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on July 8, 2019

Variety	2022 DM Yields T/A, Four-cuts and Total						2019		
	Cut 1	Cut 2	Cut 3	Cut 4	2022	2021	2020	Seeding	Trial
	June 10	July 9	Aug 22	Oct 28	Total	Total	Total	year	Total
msSunstra-184104 †	2.55	1.57	1.27	0.56	5.94*	7.60*	5.28*	1.25	20.06*
L-451Aph2+-FL2 ††	2.45	1.61	1.25	0.55	5.86*	7.48*	5.24*	1.19	19.77*
HybriForce-4420/Wet ††	2.42	1.65	1.22	0.56	5.85*	7.30*	5.33*	1.22	19.70*
SW 3407	2.52	1.72	1.26	0.52	6.01*	7.26*	5.20*	1.11	19.59*
L-451Aph2+-FL1 ††	2.49	1.53	1.26	0.55	5.82*	7.42*	5.12*	1.15	19.51*
L-451Aph2+ ANS ††	2.52	1.50	1.25	0.52	5.79*	7.37*	5.03*	1.20	19.39*
msSunstra-184108 †	2.41	1.49	1.23	0.54	5.67*	7.43*	5.11*	1.08	19.28*
1041-2	2.35	1.52	1.28	0.56	5.70*	7.15*	5.05*	1.13	19.03*
HybriForce 4400	2.44	1.38	1.17	0.51	5.49	7.32*	5.06*	1.08	18.95*
OBT 3510-FL1 †	2.34	1.52	1.19	0.51	5.57*	7.16*	4.98*	1.13	18.85*
Finch	2.32	1.39	1.18	0.51	5.40	7.13*	4.92*	1.14	18.59*
OBT 3510-FL2 †	2.28	1.48	1.15	0.50	5.42	6.95	4.99*	1.17	18.54*
OBT 3510-ANS †	2.33	1.46	1.17	0.51	5.46	6.94	5.00*	1.14	18.53*
SW 5511	2.42	1.51	1.36	0.54	5.82*	6.74	4.97*	0.95	18.48*
WL 349HQ	2.28	1.56	1.24	0.54	5.62*	6.80	4.97*	1.07	18.45*
SW 4107	2.38	1.44	1.17	0.49	5.48*	6.77	4.93*	1.07	18.26
9401	2.22	1.41	1.22	0.51	5.36*	6.83	4.67	1.02	17.89
Quail	2.21	1.40	1.14	0.56	5.31	6.72	4.78*	1.05	17.86
Triad	2.22	1.49	1.30	0.58	5.60*	6.34	4.62	1.22	17.78
Vernal (certified)	2.01	1.26	1.03	0.49	4.79	6.84	4.74*	1.22	17.60
Average	2.36	1.49	1.22	0.53	5.60	7.08	5.00	1.13	18.81
LSD 0.05	0.21	0.34	0.13	0.07	0.66	0.53	0.61	0.17	1.77
CV%	6.2	16.1	7.7	9.4	8.3	5.3	8.7	10.6	6.7
† Experimental Variety †† Released variety seeded as an experimental.									
* Yield is not statistically different from the greatest value in the column.									
ns - Total yield among varieties in this column are not statistically different.									

<b>Table 11.</b> Michigan State University Alfalfa Variety Trial Yields (DM tons/acre), MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on August 7, 2020							
Variety	2022 DM Yields T/A, Four-cuts and Total					2021 Total	Trial Total
	Cut 1 June 5	Cut 2 July 7	Cut 3 Aug 22	Cut 4 Oct 28	2022 Total		
DSX174085 †	2.30	1.70	1.68	0.66	6.34*	8.31*	14.65*
HybriForce 4400	2.08	1.45	1.59	0.61	5.73	7.86	13.58
HybriForce 4420/WET	2.13	1.46	1.61	0.63	5.82	7.78	13.60
SW 4412Y	2.23	1.44	1.59	0.58	5.83	7.77	13.60
SW 4107	2.25	1.62	1.57	0.54	5.98	7.75	13.72
SW 3407	2.24	1.58	1.63	0.58	6.03*	7.64	13.67
DSX174082 †	2.23	1.56	1.55	0.54	5.88	7.62	13.49
SW 4506	2.28	1.51	1.54	0.56	5.89	7.59	13.48
SW 5509	2.26	1.58	1.66	0.53	6.03*	7.46	13.49
DSX174083 †	2.20	1.55	1.53	0.59	5.86	7.34	13.20
Vernal (certified)	1.84	1.26	1.39	0.58	5.06	6.96	12.02
Average	2.19	1.52	1.58	0.58	5.86	7.64	13.50
LSD 0.05	0.15	0.19	0.12	0.05	0.32	0.35	0.57
CV%	5.5	9.7	5.8	7.4	4.6	3.3	3.3
† Experimental Variety * Yield is not statistically different from the greatest value in the column. ns - Total yield among varieties in this column are not statistically different.							

<b>Table 12.</b> Michigan State University Alfalfa Variety Trial Yields (DM tons/acre), MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on May 13, 2021.							
Variety	2022 DM Yields T/A, Four-cuts and Total					2021 Total	Trial Total
	Cut 1 June 4	Cut 2 July 8	Cut 3 Aug 17	Cut 4 Oct 30	2022 Total		
HybriForce 4420/WET	2.21	1.08	1.04	0.69	5.02*	0.69	5.72*
HybriForce 4400	2.14	1.08	1.03	0.67	4.92*	0.64	5.55*
SW5520Y	2.14	1.08	1.05	0.64	4.90*	0.57	5.47*
SW5517	2.12	1.12	1.05	0.63	4.92*	0.54	5.46*
54VR10	2.04	1.13	1.00	0.62	4.78*	0.60	5.39
54VQ52	2.12	1.04	0.97	0.63	4.76*	0.59	5.35
SW5615	2.07	1.07	1.03	0.60	4.77*	0.56	5.32
Bison	1.91	1.06	0.95	0.68	4.60	0.72	5.32
SW5614	2.05	1.04	1.01	0.62	4.72*	0.59	5.31
FF 42A3	1.94	1.03	0.97	0.64	4.59	0.63	5.22
54Q16	2.03	1.02	0.99	0.61	4.64	0.56	5.20
Vernal (certified)	1.96	0.88	0.87	0.58	4.29	0.64	4.93
55H96	2.00	0.90	0.88	0.60	4.37	0.55	4.93
Average	2.06	1.04	0.99	0.63	4.71	0.61	5.32
LSD 0.05	0.14	0.17	0.09	0.05	0.31	0.06	0.32
CV%	4.8	11.4	6.6	5.7	4.5	6.5	4.2
† Experimental Variety * Yield is not statistically different from the greatest value in the column. ns - Total yield among varieties in this column are not statistically different.							

**Table 13.** Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Upper Peninsula Research Station, Chatham, Michigan. Seeded May 2019.

Variety	2022 DM Yields T/A, Three-cuts and Total				2021 Total	2020 Total	Trial Total
	Cut 1 July 1	Cut 2 Aug 4	Cut 3 Oct 4	2022 Total			
1041-2	3.18	2.00	1.06	6.24*	4.25*	4.70*	15.19*
9401	2.68	1.98	1.14	5.80*	4.15*	4.52*	14.47*
Swift	3.04	1.90	1.01	5.95*	3.96*	4.45*	14.36*
SW4107	2.88	1.89	0.91	5.68	4.14*	4.32*	14.13*
SW3407	2.96	1.90	1.05	5.91*	3.86*	4.13	13.90
HybriForce 4400	2.90	1.84	1.04	5.78	3.73*	4.37*	13.87
SW5511	2.85	2.00	1.16	6.01*	3.88*	3.86	13.75
Vernal (certified)	2.85	1.60	0.82	5.27	3.67	4.21	13.15
Triad	2.66	1.74	1.00	5.40	3.26	3.67	12.33
GO 018 FU (falcata) †	2.28	0.83	0.46	3.58	2.58	3.98	10.14
Average (all entries)	2.83	1.77	0.97	5.56	3.75	4.22	13.53
LSD 0.05	0.27	0.22	0.12	0.45	0.52	0.46	1.26
CV%	6.70	8.5	8.4	5.5	9.5	7.5	6.4
Among the nine alfalfa Varieties							
Average	2.89	1.87	1.02	5.78	3.88	4.25	13.91
LSD 0.05	0.29	0.22	0.12	0.47	0.54	0.48	1.32
CV%	6.90	8.1	8.1	5.6	9.5	7.7	6.5
Comparison of Vernal (certified seed) and GO-018-FU (experimental falcata)							
Vernal (certified)	2.85	1.60	0.82	5.27	3.67	4.21	13.15
GO 018 FU (falcata) †	2.28	0.83	0.46	3.58	2.58	3.98	10.14
LSD 0.05	0.29	0.22	0.19	0.38	0.78	0.55	1.50
CV%	5.1	8.0	13.2	3.8	11.1	5.9	5.7
† Experimental Variety							
* Yield is not statistically different from the greatest value in the column.							
ns - Total yield among varieties in this column are not statistically different.							

**Table 14.** Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Upper Peninsula Research Station, Chatham, Michigan. Seeded August 3, 2021.

Variety	2022 DM Yields T/A, Three-cuts and Total			
	Cut 1 June 29	Cut 2 Aug 4	Cut 3 Oct 4	2022 Total
SW 4412Y	2.69	1.39	0.91	5.00*
SW 4107	2.61	1.37	0.79	4.77*
HybriForce 4420/Wet	2.51	1.29	0.96	4.76*
SW 4506	2.58	1.31	0.86	4.75*
SW 5509	2.65	1.32	0.77	4.74*
HybriForce 4400	2.51	1.30	0.84	4.64*
SW 3407	2.46	1.24	0.89	4.59
Bison	2.21	1.24	0.72	4.16
Average	2.53	1.31	0.84	4.68
LSD 0.05	0.19	0.15	0.22	0.38
CV%	5.0	7.9	17.9	5.5

† Experimental Variety

\* Yield is not statistically different from the greatest value in the column.



**Table 15.** Michigan State University Red Clover Variety Trial Yields (DM tons/acre), MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on August 7, 2020

Variety	Marketer	2022 DM Yields T/A, Three-cuts and Total				2021 Total	Trial Total
		Cut 1 June 6	Cut 2 July 7	Cut 3 Aug 22	2022 Total		
Evolve	DLF USA Inc	2.66	0.70	1.02	4.37*	5.68*	10.05*
Redkin	DLF USA Inc	2.49	0.59	0.81	3.90	5.96*	9.86*
Commercial variety	Check entry	2.43	0.63	0.99	4.06*	5.78*	9.84*
Freedom!MR	Barenbrug	2.22	0.72	0.97	3.91	5.73*	9.65*
Renegade	DLF USA Inc	2.07	0.70	0.75	3.52	5.70*	9.22*
Bar TP 10 †	Barenbrug	2.31	0.59	1.04	3.94	5.25*	9.19*
IS TP 12 †	DLF USA Inc	2.19	0.64	0.79	3.62	5.34*	8.96
VNS Red Clover	Public	1.76	0.50	0.09	2.35	4.87	7.22
Average		2.27	0.64	0.81	3.71	5.54	9.25
LSD 0.05		0.18	0.11	0.23	0.41	0.76	0.97
CV%		5.5	12.0	19.6	7.6	9.4	7.1
† Experimental Variety							
* Yield is not statistically different from the greatest value in the column.							

**Table 16.** Michigan State University Red Clover Variety Trial Yields (DM tons/acre), MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on May 13, 2021.

Variety		2022 DM Yields T/A, Four-cuts and Total				2022 Total	2021 Total	Trial Total
		Cut 1 June 4	Cut 2 July 9	Cut 3 Aug 17	Cut 4 Oct 30			
Commercial variety	Check entry	2.63	0.85	0.67	0.51	4.66*	1.50	6.16*
Renegade	DLF USA Inc	2.42	1.05	0.69	0.53	4.70*	1.45	6.15*
Evolve	DLF USA Inc	2.73	0.75	0.73	0.49	4.69*	1.22	5.91
TP 12 †	DLF USA Inc	2.49	0.89	0.65	0.54	4.56*	1.30	5.86
VNS Red Clover	Public	2.25	1.03	0.65	0.46	4.38	1.35	5.73
Redkin	DLF USA Inc	2.51	0.79	0.64	0.53	4.47	1.25	5.72
Average		2.51	0.89	0.67	0.51	4.58	1.34	5.92
LSD 0.05		0.09	0.08	0.04	0.07	0.16	0.16	0.23
CV%		3.0	7.3	4.8	11.2	2.9	9.8	3.3
† Experimental Variety								
* Yield is not statistically different from the greatest value in the column.								

**Table 17.** Michigan State University Perennial Grass Variety Trial Yields (DM tons/acre) of Tall Fescue, Meadow Fescue, Orchardgrass, Perennial Ryegrass, Timothy, and Bromegrass (Smooth and Meadow). MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on August 8, 2020.

<b>Orchardgrass</b>							
Variety	Heading Date ††	2022 DM yields T/A, Three-cuts and Total				2021 Total	Trial Total
		Cut 1 May 29	Cut 2 July 19	Cut 3 Oct 16	2022 Total		
OG 80 †	5/24/2022	0.95	0.97	1.10	3.01	7.81*	10.83*
Echelon	5/24/2022	1.18	0.97	1.04	3.19*	7.62*	10.81*
Inavale	5/22/2022	1.33	0.96	0.96	3.25*	7.03	10.28*
Intensiv	5/26/2022	1.19	0.85	0.90	2.94	7.26	10.20*
OG 96 †	5/26/2022	0.92	0.95	1.09	2.96	6.98	9.94
BAR DGLF 2094 †	5/27/2022	1.07	0.91	0.93	2.91	6.46	9.37
Potomac	5/19/2022	1.35	0.91	0.90	3.16*	6.19	9.36
Ammo	5/19/2022	1.24	0.66	0.74	2.64	6.53	9.17
PST DG-A1737 †	5/26/2022	0.60	0.82	0.96	2.37	6.76	9.13
PST DG-1739 †	5/22/2022	1.18	0.70	0.68	2.56	6.36	8.92
BAR DGLF 2095 †	5/28/2022	1.20	0.96	0.87	3.03*	5.89	8.92
Average		1.11	0.88	0.92	2.91	6.81	9.72
LSD 0.05		0.11	0.11	0.18	0.23	0.53	0.67
CV%		7.1	8.3	13.3	5.4	5.4	4.8
<b>Tall Fescue</b>							
Variety	Heading Date ††	2022 DM yields T/A, Three-cuts and Total				2021 Total	Trial Total
		Cut 1 June 3	Cut 2 July 19	Cut 3 Oct 16	2022 Total		
BAR FAF 137 †	5/26/2022	2.05	0.38	0.60	3.02*	8.22*	11.24*
Armory	5/22/2022	2.25	0.33	0.48	3.07*	8.11*	11.18*
PST FA-A1733 †	5/25/2022	1.95	0.31	0.84	3.10*	8.05*	11.15*
BAR FAF 146 †	5/24/2022	2.11	0.44	0.62	3.17*	7.70*	10.87*
7FACF82 †	5/26/2022	1.85	0.26	0.49	2.59	7.59*	10.18
BAR FAF 135 †	5/26/2022	1.75	0.33	0.62	2.70	7.42	10.11
Bariane	5/28/2022	1.92	0.30	0.55	2.78	7.33	10.10
BAR FAFL 239 †	5/23/2022	1.74	0.22	0.41	2.37	7.32	9.68
BAR FA 9125 †	5/24/2022	1.29	0.29	0.39	1.96	6.10	8.06
Average		1.88	0.32	0.56	2.75	7.54	10.29
LSD 0.05		0.24	0.11	0.13	0.36	0.66	0.97
CV%		8.5	23.7	15.2	8.7	5.9	6.4
Notes - Kentucky 31 minus dropped from the trial due to orchardgrass contamination.							

Table 17. 2020 Perennial Grass East Lansing continued next page




Table 17. 2020 Perennial Grass East Lansing continued (page 2 of 3)

Meadow Fescue							
		2022 DM yields T/A, Three-cuts and Total					
	Heading	Cut 1	Cut 2	Cut 3	2022	2021	Trial
Variety	Date ††	June 3	July 22	Oct 16	Total	Total	Total
PST FP-A1750 †	5/24/2022	1.60	0.17	0.64	2.41	6.67*	9.08*
BAR FPF82 †	5/26/2022	1.97	0.19	0.46	2.62*	6.31	8.93*
PST FP-A1747 †	5/26/2022	1.80	0.18	0.57	2.54*	6.34	8.88*
Pradel	5/24/2022	1.48	0.21	0.83	2.51*	6.35	8.87*
BAR FPF 77-2 †	5/25/2022	2.08	0.18	0.40	2.66*	5.95	8.61
Driftless	5/26/2022	1.62	0.25	0.67	2.54*	6.02	8.56
BAR FP 2044 †	5/24/2022	1.49	0.19	0.47	2.15	5.88	8.03
Average		1.72	0.19	0.58	2.49	6.22	8.71
LSD 0.05		0.10	0.05	0.15	0.18	0.30	0.36
CV%		3.9	16.2	17.0	5.0	3.2	2.8
Perennial ryegrass							
		2022 DM yields T/A, Three-cuts and Total					
	Heading	Cut 1	Cut 2	Cut 3	2022	2021	Trial
Variety	Date ††	June 3	July 19	Oct 16	Total	Total	Total
Remington	6/3/2022	1.22	0.37	0.32	1.90*	6.64*	8.54*
Remington NEA	6/3/2022	1.04	0.35	0.37	1.76*	6.62*	8.38*
PST LP-A1703 †	Veg	0.82	0.46	0.29	1.57*	5.55	7.12
DSV LP-A1901 †	5/27/2022	1.07	0.14	0.24	1.45	5.26	6.71
DSV LP-A1902 †	5/23/2022	1.12	0.16	0.24	1.51	4.85	6.36
Average		1.05	0.29	0.29	1.64	5.78	7.42
LSD 0.05		0.33	0.06	0.09	0.37	0.46	0.67
CV%		20.4	13.7	20.6	14.8	5.2	5.9
Timothy							
	Heading	2022 DM yield T/A - One cutting			2021		Trial
Variety	Date ††	June 3			Total		Total
Barfleo	6/3/2022	3.24			6.66*		9.90*
Baronaise	Veg	2.73			5.72		8.46
Climax	Veg	2.63			5.24		7.87
Average		2.87			5.87		8.74
LSD 0.05		0.29			0.37		0.54
CV%		5.8			3.6		3.6
Three cuttings in 2021, One in 2022.							

Table 17. 2020 Perennial Grass East Lansing continued next page

Table 17. 2020 Perennial Grass East Lansing continued (page 3 of 3)

<b>Bromegrass (Smooth and Meadow)</b>							
<b>Smooth Brome</b>	Heading Date ††	2021 DM yields T/A, Three-cuts and Total				2021 Total	Trial Total
		Cut 1 May 29	Cut 2 July 19	Cut 3 Oct 16	2022 Total		
Lincoln	5/23/2022	1.95	0.29	0.37	2.61	9.19	11.80
Artillery	5/23/2022	1.92	0.33	0.42	2.67	8.79	11.46
LSD 0.05 (Smooth Bromegrass)		0.27	0.05	0.09	0.30	0.41 ns	0.52 ns
<b>Meadow Brome</b>	Heading Date ††	Cut 1 May 29	Cut 2 July 19	Cut 3 Oct 16	2022 Total	2021 Total	Trial Total
Arsenal	5/19/2022	1.76	0.48	0.85	3.10	8.80*	11.90
Commercial check	5/19/2022	1.91	0.52	0.92	3.35	8.46	11.82
LSD 0.05 (Meadow Bromegrass)		0.35	0.11	0.17	0.59	0.30	0.41 ns
Average		1.89	0.40	0.64	2.93	8.81	11.75
LSD 0.05 (All bromegrass)		0.27	0.06	0.10	0.38	0.38	0.47
CV%		10.5	10.9	10.9	9.5	5.3	2.9
† Experimental Variety. †† Heading date      Date when 50% of all tillers have a fully emerged grass head. An emerged head is completely clear of the flag leaf Veg - Variety vegetative on the date of first cutting * Yield is not statistically different from the greatest value in the column. ns - Total yield among varieties in this column are not statistically different.							
							

**Table 18.** Michigan State University Perennial Grass Variety Trial Yields (DM tons/acre) of Tall Fescue, Perennial Ryegrass, and Timothy. MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on May 14, 2021.

<b>Tall Fescue</b>					
Variety	Heading Date ††	2022 DM yields T/A, Three-cuts and Total			
		Cut 1 May 29	Cut 2 July 19	Cut 3 Oct 25	2022 Total
Bar Fafr 160184 †	5/23/2022	0.99	0.73	1.14	2.86*
Bar Fafr 181197 †	5/24/2022	0.86	0.79	0.98	2.63*
STF 43	5/25/2022	0.70	0.73	1.01	2.44
Bar Fafr 184270 †	5/23/2022	0.97	0.53	0.82	2.32
Average		0.88	0.70	0.99	2.56
LSD 0.05		0.20	0.21	0.10	0.23
CV%		18.2	25.3	8.5	7.7
<b>Perennial ryegrass</b>					
Variety	Heading Date ††	2022 DM yields T/A, Three-cuts and Total			
		Cut 1 June 4	Cut 2 July 22	Cut 3 Oct 25	2022 Total
Remington NEA2	6/3/2022	1.87	0.25	0.40	2.53
Dexter 1	5/28/2022	1.80	0.23	0.39	2.42
Bar LP237 †	Veg	1.72	0.21	0.40	2.32
Average		1.80	0.23	0.40	2.42
LSD 0.05		0.20	0.09	0.24	0.32 ns
CV%		6.5	23.9	35.3	7.7
<b>Timothy</b>					
Variety	Heading Date ††	2022 DM yields T/A, Three-cuts and Total			
		Cut 1 June 4	Cut 2 July 22	Cut 3 Oct 25	2022 Total
Valor	5/29/2022	2.56	0.30	0.69	3.54*
Zenyatta	5/28/2022	2.51	0.33	0.59	3.42*
Climax	Veg	2.41	0.26	0.44	3.12
Average		2.49	0.30	0.57	3.36
LSD 0.05		0.19	0.16	0.11	0.26
CV%		4.5	31.0	10.9	4.5
† Experimental Variety. †† Heading date      Date when 50% of all tillers have a fully emerged grass head. An emerged head is completely clear of the flag leaf Veg - Variety vegetative on the date of first cutting * Yield is not statistically different from the greatest value in the column. ns - Total yield among varieties in this column are not statistically different.					

Table 19. Michigan State University Perennial Grass Variety Trial Yields (DM tons/acre) of Tall Fescue, Meadow Fescue, Orchardgrass, Timothy, and Bromegrass (Smooth and Meadow). Upper Peninsula Research and Extension Center, Chatham, Michigan. Seeded August 2020

### Tall Fescue

Variety	2022 DM yields T/A, Two-cuts			2021 Total	Trial Total
	Cut 1	Cut 2	2022		
	June 28	Oct 4	Total		
Armory	2.33	0.63	2.96*	1.43	4.40*
BAR FAF 146 †	2.12	0.69	2.81*	1.49	4.30*
BAR FAF 135 †	1.64	1.12	2.76*	1.45	4.21*
Bariane	1.63	0.86	2.49*	1.55	4.04*
BAR FAF 137 †	1.65	0.71	2.37	1.29	3.66
BAR FAFL 239 †	2.03	0.53	2.56*	1.00	3.55
7FACF82 †	1.42	0.75	2.17	1.10	3.28
BAR FA 9125 †	0.92	0.86	1.78	1.05	2.83
Average	1.72	0.77	2.49	1.30	3.78
LSD 0.05	0.34	0.40	0.51	0.30	0.70
CV%	12.9	35.5	13.7	15.9	12.5

### Timothy

	2022 One-cutting, DM T/A ††	2021	Trial
Variety	July 8	Total	Total
Climax	2.93*	1.28	4.21
Barfleo	2.85*	1.27	4.12
Baronaise	2.61	1.27	3.88
Average	2.80	1.27	4.07
LSD 0.05	0.31	0.42 ns	0.71 ns
CV%	6.3	19.3	10.1

### Meadow Fescue

Variety	2022 DM yields T/A, Two-cuts			2021 Total	Trial Total
	Cut 1	Cut 2	2022		
	June 28	Oct 4	Total		
BAR FPF 82 †	1.66	0.59	2.25*	2.55*	4.80*
Pradel	1.38	1.01	2.39*	2.28*	4.67*
BAR FPF 77-2 †	1.82	0.66	2.48*	1.99	4.47*
Driftless	1.38	0.92	2.30*	2.05	4.35*
BAR FP 2044 †	1.10	0.95	2.06	2.19	4.24
Average	1.47	0.59	2.30	2.21	4.50
LSD 0.05	0.19	0.11	0.23	0.35	0.54
CV%	8.7	8.6	6.7	10.4	7.8

### Orchardgrass

Variety	2022 DM yields T/A, Two-cuts			2021 Total	Trial Total
	Cut 1	Cut 2	2022		
	June 28	Oct 3	Total		
BAR DGLF 2095 †	0.86	0.90	1.76*	1.79*	3.55*
Potomac	0.94	0.80	1.74*	1.68*	3.42*
Intensiv	0.84	0.76	1.60*	1.57*	3.17*
Ammo	0.93	0.58	1.50*	1.25*	2.75*
BAR DGLF 2094 †	0.61	0.55	1.16	1.14	2.29
Average	0.84	0.72	1.55	1.49	3.04
LSD 0.05	0.37	0.25	0.54	0.58	1.08
CV%	28.8	23.1	22.8	25.4	23.1

Table 19 - Chatham 2020 Perennial grass seeding continued next page

Table 19 - Chatham 2020 Perennial grass seeding continued (page 2 of 2)

Smooth Brome grass				Meadow Brome grass					
Variety	2022 One-cutting, DM T/A ††	2021	Trial	Variety	2022 DM yields T/A, Two-cuts			2021	Trial
	June 15	Total	Total		Cut 1	Cut 2	2022	Total	Total
Artillery	1.90	2.04	3.94	Arsenal	1.82	0.60	2.42	2.44	4.86
Lincoln	1.84	1.90	3.74	Commercial check	1.52	0.58	2.10	2.45	4.55
Average	1.87	1.97	3.84	Average	1.67	0.59	2.26	2.45	4.71
LSD 0.05	0.54 ns	0.36 ns	0.83 ns	LSD 0.05	0.73	0.45	1.10 ns	0.60 ns	1.67 ns
CV%	12.9	8.10	9.6	CV%	19.3	34.2	21.6	10.90	15.8

† Experimental Variety

†† Smooth brome grass one cutting in 2022, timothy one cutting per year in both 2021 and 2022.

\* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.



**Tables 20 to 22.** 2022 Red Clover, Alfalfa, and Perennial Grass Variety Trial Seedings. Seeding-year Yields in Dry Matter Tons per Acre, Per Cut and Total. East Lansing, Michigan.

**Table 20.** Red Clover Variety Trial seeded on May 24 and harvested on July 20 and September 22, 2022

Variety	Cut 1	Cut 2	Total	Variety	Cut 1	Cut 2	Total
Commercial check	0.92	1.49	2.42	Freedom!MR	0.66	1.43	2.08
Evolve	0.77	1.49	2.26	Medallion	0.80	1.25	2.05
Redkin	0.85	1.30	2.15	VNS Red Clover	0.80	1.24	2.03
BAR TP V23 †	0.67	1.47	2.14	Ruby Red Brand	0.66	1.36	2.01
BAR TS RWR †	0.78	1.36	2.14				
† Experimental Variety				Average	0.77	1.38	2.14
				LSD 0.05	0.23	0.17	0.29
				CV %	20.6	8.6	9.3

**Table 21.** Alfalfa Variety Trial seeded on May 24 and harvested on July 20 and September 22, 2022

Variety	Cut 1	Cut 2	Total	Variety	Cut 1	Cut 2	Total
Mariner V	1.18	0.87	2.05	Signature	1.10	0.75	1.85
HybriForce-4420/WET	1.14	0.83	1.97	AFX-184035 †	1.15	0.69	1.85
HybriForce-4400	1.18	0.79	1.97	AFX 479	1.08	0.76	1.84
DSX-184021 †	1.15	0.83	1.97	Viking 374HD	1.07	0.73	1.79
54Q29	1.17	0.79	1.96	FF 42.A3	1.03	0.72	1.75
Viking 394AP	1.16	0.78	1.93	54Q16	1.03	0.71	1.75
DSX-174083 †	1.16	0.71	1.87	SW5615	1.01	0.72	1.73
54VQ52	1.10	0.77	1.87				
† Experimental Variety				Average	1.11	0.76	1.88
				LSD 0.05	0.18	0.13	0.27
				CV%	11.1	12.0	10.3

**Table 22.** Perennial Grass Variety Trials. Seeded on August 12 and harvested on November 3, 2022.

Orchardgrass				Perennial Ryegrass	
Variety	DM T/A	Variety	DM T/A	Variety	DM T/A
OG 96 †	1.10	BAR DGL22100-D †	0.67	Halsey	1.54
Captur	0.97	BAR DGL22098 †	0.67	Dexter 1	0.99
Potomac	0.84	BAR DGL22100-C †	0.67	Check variety	0.98
Intensiv	0.79	BAR DGL22099 †	0.65	TetraGain SLT	0.87
Swante	0.77	Persist II	0.58		
Persist	0.75	Ammo	0.58		
Barlegro	0.75			Average	1.10
† Experimental Variety		Average	0.75	LSD 0.05	0.15
		LSD 0.05	0.13	CV%	8.8
		CV%	12.1		



**Table 23.** Michigan State University 2022 Annual Grass Variety Trial Yields (DM tons/acre) of Annual, Intermediate and Italian ryegrass varieties seeded at the MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded on May 17, 2022.

Variety - type	Marketer	2022 DM Yields T/A, Three-cuts and Total			
		Cut 1	Cut 2	Cut 3	2022
		July 9	Aug 17	Oct 24	Total
Mantis - Annual	Smith Seed	1.03	1.20	0.65	2.87
Halsey - Intermediate	Smith Seed	0.75	1.16	0.52	2.43
Marshall - Annual	Public	1.17	0.90	0.34	2.41
Green Spirit - Italian	Barenbrug	0.70	1.15	0.56	2.41
Dexter - Annual	Smith Seed	0.90	0.86	0.26	2.03
Meroa - Annual	Smith Seed	0.81	0.85	0.31	1.97
Grazekeeper - Annual	Smith Seed	0.80	0.91	0.18	1.89
Koga - Annual	Smith Seed	0.67	0.97	0.18	1.82
Average		0.85	1.00	0.37	2.23
LSD 0.05		0.17	0.12	0.11	0.24
CV %		13.0	8.4	19.9	7.2

**Table 24.** Michigan State University 2021 and 2022 Annual Grass Variety Trial Yields (DM tons/acre) of Two Italian ryegrass varieties seeded at the MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded May 11, 2021 and harvested in 2021 and 2022.

Variety	Marketer	2021 Yield, 3-cuts and total				2022 Yield, 2-cuts and Total			
		Cut 1	Cut 2	Cut 3	2021	Cut 1	Cut 2	2022	Trial
		7/22	9/9	11/6	Total	5/29	7/7	Total	Total
Melina	Allied	1.27	0.97	0.25	2.49	1.85	1.11	2.96	5.45
Green Spirit	Barenbrug	1.11	0.98	0.24	2.33	1.81	1.03	2.84	5.17
Average		1.19	0.97	0.25	2.41	1.83	1.07	2.9	5.31
LSD 0.05		ns	ns	ns	ns	ns	ns	ns	ns
CV%		9.3	2.3	9.6	3.6	6.1	4.3	5.3	3.7

**Table 25.** Michigan State University 2021-2022 Winter Small Grain Forage Variety Trial Yields (DM tons/acre). MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Planted September 21, 2021

### Rye and Hybrid Rye entries

Variety	Harvest date	% Survival	Vigor	Height (Inches)	DM Yield Tons/acre	% DM
Aroostook	May 11	90.0	9.8	28.8	2.82	14.6
Hazlet	May 13	100.0	10.0	28.8	2.70	13.4
KWS Progas	May 13	92.5	9.5	27.8	2.66	13.8
KWS Propower	May 13	100.0	9.8	24.3	2.59	13.5
Wheeler	May 13	95.0	9.5	29.3	2.54	13.5
TriCal Swift	May 11	77.5	7.8	28.0	2.16	15.2
Exp entry 5 †	May 13	47.5	6.0	21.8	1.80	15.1
Exp entry 6 †	May 11	52.5	6.8	23.5	1.79	14.5
Average		81.9	8.6	26.5	2.38	14.2
LSD 0.05 rye and hybrid rye		11.1	1.1	2.2	0.31	0.90
CV%		9.2	8.5	5.6	8.9	4.3

### Triticale entries

Variety	Harvest date	% Survival	Vigor	Height (Inches)	DM Yield Tons/acre	% DM
TriCal Gainer 154	May 17	90.0	9.0	23.3	3.21	14.4
TriCal Flex 719	May 20	75.0	7.3	26.8	3.00	14.6
TriCal Thor	May 20	62.5	5.8	25.3	2.75	14.2
Exp entry T02 †	May 20	67.5	6.8	23.0	2.77	16.1
TriCal Gunner	May 20	55.0	6.8	24.3	2.46	15.4
Average		70.0	7.1	24.5	2.84	14.9
LSD 0.05 triticale entries		14.5	1.0	1.7	0.36	0.87
CV%		13.5	8.9	4.5	8.3	3.8
Average of all 13 entries		77.3	8.0	25.7	2.56	14.49
LSD 0.05 - all entries		12.4	1.0	1.9	0.32	0.93
CV %		11.2	8.9	5.0	8.6	4.5

† Experimental Variety - may not be commercially available

**Table 26.** Michigan State University 2022 Multiple-cutting Sorghum Sudangrass Variety Trial Yields (DM tons/acre). MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Planted June 13, 2022

Variety	Type	Heading date ††	Cut 1 - August 10, 2022			Cut 2 - September 27, 2022			Total DM T/A
			Height feet	DM T/A	DM %	Height feet	DM T/A	DM %	
Viking 100	Sorghum-sudangrass	August 7	6.2	3.24	18.0	4.0	2.48	19.4	5.72
Viking 200	Sorghum-sudangrass	August 8	6.4	3.19	17.7	3.9	2.34	20.0	5.54
Exp entry 1 †	Sorghum-sudangrass	Vegetative	5.8	3.04	18.5	3.6	2.36	18.5	5.40
Exp entry 2 †	Sorghum-sudangrass	August 9	6.0	3.05	16.7	3.9	2.15	20.2	5.21
Piper (Check)	Sudangrass	August 7	6.2	2.77	20.4	4.9	2.35	25.9	5.12
Viking 300	Sorghum-sudangrass	Vegetative	6.0	2.92	15.1	3.5	2.02	21.2	4.95
Viking O510	Sudangrass	August 9	5.5	2.86	16.8	3.3	1.99	20.0	4.85
Viking 150	Sorghum-sudangrass	Vegetative	5.9	2.86	16.0	3.5	1.98	20.1	4.84
Viking O210	Sorghum-sudangrass	Vegetative	5.7	2.70	15.4	3.2	2.00	19.6	4.71
Viking O225	Sorghum-sudangrass	Vegetative	5.6	2.61	15.2	3.2	1.76	21.2	4.37
Viking 232	Sorghum-sudangrass	Vegetative	4.2	2.40	17.0	2.4	1.76	22.0	4.16
Average			5.8	2.88	17.0	3.6	2.10	20.7	4.99
LSD 0.05			0.3	0.37	1.7	0.4	0.31	1.5	0.51
CV%			3.7	8.8	6.9	7.3	10.1	5.0	7.0

**Table 27.** Michigan State University 2022 Single-cut Sorghum Sudangrass and Forage Sorghum Variety Trial Yields (DM tons/acre). MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Planted June 13, 2022

Entry	Type	Heading date ††	One cutting - September 1, 2022		
			Height feet	DM T/A	DM %
Viking 300	Sorghum-sudangrass	Vegetative	7.7	6.37	23.0
Viking 150	Sorghum-sudangrass	August 20	7.6	6.17	25.1
Viking 200	Sorghum-sudangrass	August 8	6.6	5.53	26.3
Exp entry 1 †	Sorghum-sudangrass	August 18	6.9	5.17	26.1
Viking O225	Sorghum-sudangrass	August 22	6.4	4.80	21.2
Viking 401	Forage Sorghum	August 18	6.6	4.06	20.5
Average			7.0	5.35	23.7
LSD 0.05			0.6	0.96	1.6
CV%			4.5	9.8	3.8

† Experimental entry - not commercially available

†† Heading dates - Date when 20% of plants had a seed head, or were vegetative at harvest.

**Table 28.** Michigan State University 2022 Berseem Clover Variety Trial. Total Biomass and Clover yields (DM tons/acre) and percent clover. MSU Plant Soil and Microbial Sciences Agronomy Farm, East Lansing, Michigan. Seeded May 17, 2022.

Variety	Marketer	Cut 1 - July 11			Cut 2 -August 17			Cut 3 Oct 24	Total
		DM T/A			DM T/A			DM T/A	DM T/A
		Total Biomass	Clover	% Clover	Total Biomass	Clover	% Clover	Clover	Clover
CW 8093 †	Barenbrug	1.47	1.01	71	1.69	1.19	70	0.50	2.69
Bigbee	Check entry	1.14	0.54	47	1.91	1.07	56	0.85	2.47
Frosty	GO Seeds	1.13	0.53	56	1.95	1.11	58	0.68	2.32
Super 10	Barenbrug	1.46	0.85	62	1.66	0.91	57	0.45	2.21
Lightning	Smith Seed	0.89	0.47	56	1.97	1.20	61	0.53	2.20
Helaly	Smith Seed	1.39	0.94	74	1.35	0.54	43	0.00	1.49
Average		1.24	0.72	60.8	1.76	1.00	58	0.60	2.23
LSD 0.05		0.46	0.32	34	0.31	0.59	35	0.23	1.01
CV%		24.3	29.7	37.1	11.7	38.8	40.1	29.7	30.2

† Experimental entry - not commercially available

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**Appendix II - East Lansing, Michigan**

Rainfall data at the Michigan State University Agronomy farm by date, Summer 2022

Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches
April 1		May 1	0.16	June 1		July 1		Aug 1		Sept 1		Oct 1	
April 2	0.02	May 2	0.01	June 2		July 2		Aug 2		Sept 2		Oct 2	
April 3	0.05	May 3	0.80	June 3		July 3		Aug 3		Sept 3		Oct 3	
April 4	0.30	May 4		June 4		July 4		Aug 4	1.14	Sept 4	0.11	Oct 4	
April 5		May 5		June 5		July 5	0.45	Aug 5	0.39	Sept 5		Oct 5	
April 6	0.41	May 6	0.09	June 6		July 6		Aug 6		Sept 6		Oct 6	
April 7	0.04	May 7		June 7	0.83	July 7		Aug 7		Sept 7		Oct 7	0.08
April 8	0.34	May 8		June 8		July 8		Aug 8	0.88	Sept 8		Oct 8	
April 9		May 9		June 9	0.22	July 9		Aug 9		Sept 9		Oct 9	
April 10		May 10		June 10		July 10		Aug 10		Sept 10		Oct 10	
April 11	0.01	May 11		June 11		July 11		Aug 11		Sept 11		Oct 11	
April 12		May 12		June 12		July 12	0.28	Aug 12		Sept 12	0.81	Oct 12	0.39
April 13	0.22	May 13		June 13	0.38	July 13		Aug 13		Sept 13		Oct 13	0.22
April 14	0.05	May 14		June 14		July 14		Aug 14		Sept 14		Oct 14	
April 15		May 15	0.35	June 15	0.05	July 15		Aug 15	0.53	Sept 15		Oct 15	0.20
April 16		May 16		June 16		July 16		Aug 16		Sept 16		Oct 16	
April 17		May 17		June 17		July 17		Aug 17		Sept 17		Oct 17	
April 18	0.17	May 18		June 18		July 18		Aug 18		Sept 18		Oct 18	
April 19	0.01	May 19	0.26	June 19		July 19		Aug 19		Sept 19	0.03	Oct 19	0.48
April 20		May 20		June 20	0.06	July 20		Aug 20		Sept 20		Oct 20	
April 21	0.13	May 21		June 21		July 21		Aug 21		Sept 21	1.12	Oct 21	
April 22	0.32	May 22	0.44	June 22		July 22		Aug 22	0.42	Sept 22		Oct 22	
April 23	0.55	May 23		June 23		July 23	0.08	Aug 23		Sept 23		Oct 23	
April 24	0.35	May 24		June 24		July 24	1.18	Aug 24		Sept 24		Oct 24	
April 25		May 25		June 25		July 25	0.03	Aug 25		Sept 25		Oct 25	
April 26		May 26	0.36	June 26		July 26		Aug 26		Sept 26	0.32	Oct 26	0.50
April 27		May 27	0.15	June 27		July 27		Aug 27		Sept 27		Oct 27	
April 28		May 28		June 28		July 28	0.02	Aug 28	0.27	Sept 28		Oct 28	
April 29		May 29		June 29	0.70	July 29		Aug 29		Sept 29		Oct 29	
April 30	0.04	May 30		June 30		July 30		Aug 30	0.34	Sept 30		Oct 30	
		May 31				July 31		Aug 31				Oct 31	
2022 Totals	3.01		2.62		2.24		2.04		3.97		2.39		1.87
Normal	3.03		3.36		3.45		2.84		3.23		3.50		2.53

**Appendix III - Chatham, Michigan NWS**

Rainfall data at the Michigan State University UP Experiment Station by date, Summer 2022

Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches
April 1	0.20	May 1		June 1		July 1	0.38	Aug 1	0.04	Sept 1		Oct 1	
April 2		May 2	0.14	June 2		July 2		Aug 2	0.16	Sept 2		Oct 2	
April 3	0.09	May 3	T	June 3		July 3		Aug 3	0.63	Sept 3		Oct 3	
April 4	0.04	May 4		June 4		July 4	0.25	Aug 4	0.02	Sept 4		Oct 4	
April 5	0.80	May 5		June 5		July 5	0.35	Aug 5		Sept 5		Oct 5	
April 6		May 6		June 6	0.05	July 6	0.02	Aug 6		Sept 6		Oct 6	0.13
April 7	0.77	May 7		June 7	0.05	July 7		Aug 7	0.43	Sept 7		Oct 7	0.31
April 8	0.23	May 8		June 8		July 8		Aug 8	0.45	Sept 8		Oct 8	
April 9	0.14	May 9		June 9	0.32	July 9		Aug 9	0.02	Sept 9		Oct 9	
April 10		May 10		June 10		July 10		Aug 10		Sept 10	0.06	Oct 10	
April 11		May 11		June 11		July 11		Aug 11		Sept 11	0.26	Oct 11	0.01
April 12		May 12	0.80	June 12	0.40	July 12	0.03	Aug 12		Sept 12	0.17	Oct 12	
April 13	0.85	May 13	0.36	June 13	0.01	July 13		Aug 13	0.06	Sept 13	0.10	Oct 13	0.77
April 14	0.93	May 14	0.02	June 14	0.02	July 14		Aug 14	0.06	Sept 14	0.01	Oct 14	0.86
April 15	T	May 15		June 15		July 15		Aug 15		Sept 15		Oct 15	
April 16		May 16		June 16	1.40	July 16		Aug 16		Sept 16	0.03	Oct 16	
April 17		May 17		June 17	0.10	July 17		Aug 17		Sept 17	0.52	Oct 17	0.57
April 18	0.06	May 18		June 18		July 18		Aug 18		Sept 18		Oct 18	0.68
April 19	0.18	May 19	0.01	June 19		July 19	0.16	Aug 19	0.81	Sept 19	0.01	Oct 19	0.70
April 20		May 20	0.38	June 20	0.27	July 20	T	Aug 20		Sept 20		Oct 20	0.06
April 21	0.40	May 21	0.13	June 21		July 21	0.17	Aug 21	0.54	Sept 21		Oct 21	
April 22		May 22	0.01	June 22		July 22		Aug 22	0.01	Sept 22	0.30	Oct 22	
April 23	0.24	May 23	0.08	June 23		July 23	0.05	Aug 23	0.10	Sept 23	0.01	Oct 23	
April 24		May 24		June 24		July 24	0.08	Aug 24	0.08	Sept 24		Oct 24	0.02
April 25		May 25		June 25	T	July 25		Aug 25	0.46	Sept 25	0.11	Oct 25	0.05
April 26	0.03	May 26	0.25	June 26	0.16	July 26		Aug 26	0.05	Sept 26	1.53	Oct 26	0.06
April 27	0.08	May 27	0.18	June 27		July 27	0.40	Aug 27		Sept 27	0.44	Oct 27	0.03
April 28		May 28		June 28		July 28	0.10	Aug 28		Sept 28	0.22	Oct 28	
April 29		May 29	0.15	June 29	0.11	July 29		Aug 29	0.47	Sept 29		Oct 29	
April 30		May 30		June 30	1.05	July 30		Aug 30		Sept 30		Oct 30	
		May 31				July 31		Aug 31				Oct 31	
2022 Totals	5.04		2.51		3.94		1.99		4.39		3.77		4.25
Normal	2.44		3.27		3.37		3.58		3.03		4.25		4.74

Marketers	Web Addresses	Phone
Albert Lea Seed	<a href="http://www.alseed.com">www.alseed.com</a>	800-352-5247
Alforex Seeds	<a href="http://www.alforexseeds.com">www.alforexseeds.com</a>	877-560-5181
Allied Seed	<a href="http://www.alliedseed.com">www.alliedseed.com</a>	—
America's Alfalfa	<a href="http://www.americasalfalfa.com">www.americasalfalfa.com</a>	800-406-7662
Barenbrug USA	<a href="http://www.barusa.com">www.barusa.com</a>	800-547-4101
Bayer	<a href="http://www.cropscience.bayer.com">www.cropscience.bayer.com</a>	800-768-6387
Beck's Hybrids	<a href="http://www.beckshybrids.com">www.beckshybrids.com</a>	800-937-2325
Best Forage	<a href="http://www.bestforage.com">www.bestforage.com</a>	888-836-3697
Blue River Organic Seeds	<a href="http://www.blueriverorgseed.com">www.blueriverorgseed.com</a>	800-370-7979
Brett Young Seeds	<a href="http://www.brettyoung.ca">www.brettyoung.ca</a>	800-665-5015
Byron Seed	<a href="http://www.byronseeds.net">www.byronseeds.net</a>	800-801-3596
CISCO Seed	<a href="http://www.ciscoseeds.com">www.ciscoseeds.com</a>	800-888-2986
Channel	<a href="http://www.channel.com">www.channel.com</a>	—
Columbia Seed	<a href="http://www.columbiaseeds.com">www.columbiaseeds.com</a>	888-681-7333
CropLan Genetics	<a href="http://www.winfieldunited.com">www.winfieldunited.com</a>	—
Dairyland Seed Co.	<a href="http://www.dairylandseed.com">www.dairylandseed.com</a>	800-236-0163
Dekalb	<a href="http://www.dekalbasgrowdeltapine.com">www.dekalbasgrowdeltapine.com</a>	—
DLF USA Inc	<a href="http://www.dlfpickseed.com">www.dlfpickseed.com</a>	800-445-2251
Farm Science	<a href="http://www.farmsciencegenetics.com">www.farmsciencegenetics.com</a>	—
GO Seed	<a href="http://goseed.com">http://goseed.com</a>	503-566-9900
Hood River Seeds	<a href="http://www.hoodriverseed.com">www.hoodriverseed.com</a>	855-406-2696
KWS Seeds	<a href="http://www.kws.com">www.kws.com</a>	952-445-8911
La Crosse Forage and Turf	<a href="http://www.lacrosseseed.com">www.lacrosseseed.com</a>	800-647-8873
Legacy Seed	<a href="http://www.legacyseeds.com">www.legacyseeds.com</a>	866-791-6390
Lewis Seed Co.	<a href="http://www.lewisseed.com">www.lewisseed.com</a>	541-491-3700
LG Seeds	<a href="http://www.lgseeds.com">www.lgseeds.com</a>	989-834-2251
Mountain View Seeds	<a href="http://www.mtviewseeds.com">www.mtviewseeds.com</a>	503-588-7333
Nexgrow	<a href="http://www.plantnexgrow.com">www.plantnexgrow.com</a>	855-463-9476
Pioneer	<a href="http://www.pioneer.com">www.pioneer.com</a>	800-247-6803
Producers Choice	<a href="http://www.alforexseeds.com">www.alforexseeds.com</a>	877-560-5181
ProSeeds Marketing	<a href="http://www.proseedsmarketing.com">www.proseedsmarketing.com</a>	541-928-9999
Renk Seed	<a href="http://www.renkseed.com">www.renkseed.com</a>	800-289-7365
Seed Research of Oregon	<a href="http://www.sroseed.com">www.sroseed.com</a>	800-253-5766
Smith Seed Services	<a href="http://www.smithseed.com">www.smithseed.com</a>	888-550-2930
S&W Seeds	<a href="http://www.swseedco.com">www.swseedco.com</a>	916-554-5480
TriCal	<a href="http://www.tricalforage.com">www.tricalforage.com</a>	843-817-2484
Thomas Ag Services	<a href="http://thomasag.com">http://thomasag.com</a>	541-497-5010
Wilbur-Ellis Seeds	<a href="http://ag.wilburellis.com">http://ag.wilburellis.com</a>	—
Winfield Solutions	<a href="http://www.winfieldunited.com">www.winfieldunited.com</a>	989-845-2093
W-L Research	<a href="http://www.wlalfalfas.com">www.wlalfalfas.com</a>	—